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ABSTRACT

This document is part of series that seeks to help people think constructively about foreign policy issues, to improve citizen involvement, and to encourage debate on public issues. "Global Environmental Problems"; "The Human Factor in the Changing Environment"; "Public Policy and the Environment"; and "The U.S. Role in Global Environmental Politics" are the issues for discussion. Options that the document suggests for debate appear under the headings "Putting the Economy First"; "Taking the Lead"; "Sharing Environmental Leadership"; and "Global Stewardship." The document includes a note to teachers, a lesson plan and student activities, supplementary documents for the teacher, and a listing of suggested readings. (SG)

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CHOICES FOR THE 21ST CENTURY

Global Environmental Problems: Implications For U.S. Policy

SO 023 683

ALTERNATIVES FOR PUBLIC DEBATE AND POLICY DEVELOPMENT

A project of the Center for Foreign Policy Development

Brown University, Box 1948, Providence, RI 02912

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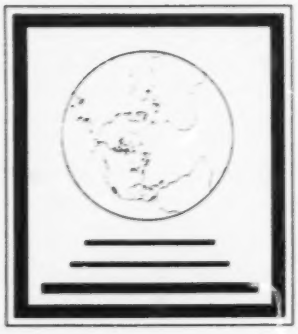

THE CHOICES FOR THE 21ST CENTURY EDUCATION PROJECT was established at the Center for Foreign Policy Development to help citizens think constructively about foreign policy issues, to improve participatory citizenship skills, and to encourage public judgment on policy priorities.

THE CENTER FOR FOREIGN POLICY DEVELOPMENT of the Thomas J. Watson Jr. Institute for International Studies at Brown University is a non-profit research organization. Its mandate is to bring together scholars, policymakers, and the public in a search for policy choices that can lead to a consensus on U.S. national security and foreign policy.

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CHOICES

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The Choices for the 21st Century Education Project develops curricula for high schools and colleges on current foreign policy issues and offers workshops, institutes, and in-service programs for high school teachers. Course materials place special emphasis on the importance of educating students in their participatory role as citizens.

The Choices for the 21st Century Education Project is a project of the **Center for Foreign Policy Development** of the Thomas J. Watson Jr. Institute for International Studies at Brown University.

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Note to Teachers

Until recently, concern about the environment was focused almost exclusively on local and national problems. The smog of Southern California, the pollution of the Great Lakes, and the nuclear accident at Three Mile Island dominated our thinking about environmental issues. However, many threats to the environment – such as ozone depletion, global warming, and acid rain – are increasingly recognized as problems that transcend national boundaries. As such, environmental concerns have emerged as a foreign policy question, closely linked to economic policy. The United Nations Conference on Environment and Development that took place in Rio de Janeiro in June 1992 placed this tangle of issues at the center of the world stage.

Although global environmental problems began to gain public attention in the 1980s, the concept that environmental problems are global is still in the process of definition. *Global Environmental Problems: Implications for U.S. Policy* explores the relationship between U.S. foreign policy and the health of the planet. With this unit, students will be grappling with the same tough questions that are confronting policymakers.

At the core of the unit is a framework of four distinct options that allows students to consider a range of alternatives for U.S. policy toward global environmental problems. Using this framework, students are compelled to ponder a wide variety of considerations that enter into the discussion of U.S. policy on this critical international issue. The background readings were written with the complexities of the debate on the environment in mind. Part I and Part II briefly explain the causes and effects of the leading global environmental problems, while Part III and Part IV discuss the environmental agenda of the international community and examine key components of the controversy over environmental policy in the United States.

Global Environmental Problems: Implications for U.S. Policy includes a five-day lesson plan and student activities. The lesson plan begins by introducing students to the concept of global environmental problems, then engages them in a role play that delineates the contrasting perspectives of different areas of the world. After weighing environmental issues in a global context, students evaluate U.S. options in the course of a two-day simulation. Finally, students apply what they have learned in developing their own option for U.S. policy.

Below is an outline of the "Five-Day Lesson Plan" found on pages 29-31. You may also find the "Alternative Three-Day Lesson Plan" useful. The "Student Text" (pages 1-28) contains the background readings and the four options. Student handouts follow the lesson plan. The lesson plan offered in this unit is a guide. Many teachers choose to devote additional time to certain activities. We hope that these suggestions help you in tailoring the unit to fit the needs of your classroom.

Day One: Defining global environmental problems
Homework: Read Part I and Part II of the background readings and complete "Study Guide – Parts I and II"

Day Two: Global environmental problems in the international arena
Homework: Read Part III and Part IV of the background readings and complete "Study Guide – Parts III and IV"

Day Three: Role playing the four options: organization and preparation
Homework: Complete preparations for the simulation

Day Four: Role playing the four options: debate and discussion
Homework: Read the four options, then fill out "Focusing Your Thoughts" and complete "Your Option Five"

Day Five: Looking into the future
Extra Challenge: Write a persuasive letter based on "Your Option Five"

Our planet's environment

A bustling steel mill in South Korea. Farmland newly cleared from the jungle in Brazil. A computer assembly plant in the United States. Together, these images suggest the technological progress that characterizes the modern world. Without question, the strides in industry and agriculture in the past century have been unparalleled in human history.

But look again. The advances that have brought new prosperity to much of the globe have come at a price. The smokestacks of the steel mill spew out pollutants that spread to other countries. The farm was carved out of rainforest that previously served as home for dozens of rare plants and animals. The computer plant relies on chemical cleaning agents that may threaten the earth's atmosphere.

In making use of the earth's resources, humanity has assumed a greater and greater role in shaping the planet's environment. In recent years, people around the world have come to recognize that the continued expansion of human activity has spawned a new set of problems that extends beyond national borders. In an increasingly interconnected world, global environmental problems have become a subject of concern for many Americans. These issues have taken a more prominent position on the international agenda since the end of the Cold War between the United States and the Soviet Union. In fact, some experts predict that environmental issues will dominate international relations in the 21st century.

Global warming

Much of the current anxiety regarding environmental problems has revolved around global warming. Many scientists believe that man-made changes in the atmosphere over the last 200 years will produce a worldwide increase in temperatures during the 21st century.

The build-up of gases, such as carbon dioxide, methane, nitrogen oxides, chlorofluorocarbons (CFCs), and other trace gases, is thought to contribute to global warming. These gases are called greenhouse gases because they trap heat in the atmosphere in much the same way that a greenhouse prevents heat from escaping beyond its glass panels.

Carbon dioxide is the greenhouse gas that has received the most attention from scientists. Carbon dioxide is essential for life on earth. Plants require carbon dioxide for life just as animals need oxygen. Moreover, carbon dioxide absorbs much of the earth's infrared (long-wave) energy that would otherwise be radiated back into space. By absorbing this heat energy, carbon dioxide keeps the earth warm enough to support life.

Humanity, however, has added carbon dioxide to the atmosphere by burning fossil fuels — oil, coal, and natural gas. Fossil fuels were formed from plants and animals that lived millions of years ago. Over eons, this organic matter accumulated under the earth's crust and was transformed into fossil fuel by intense heat and pressure. Since the Industrial Revolution began late in the 18th century, much of the world has come to depend on fossil fuels. As a result, the amount of carbon dioxide in the atmosphere has increased by 25 percent.

In the last few years, scientists have begun to study the connection between fossil fuel emissions and the global environment. Many scientists predict that the build-up in carbon dioxide and other greenhouse gases will increase temperatures three to eight degrees Fahrenheit by the end of the next century.

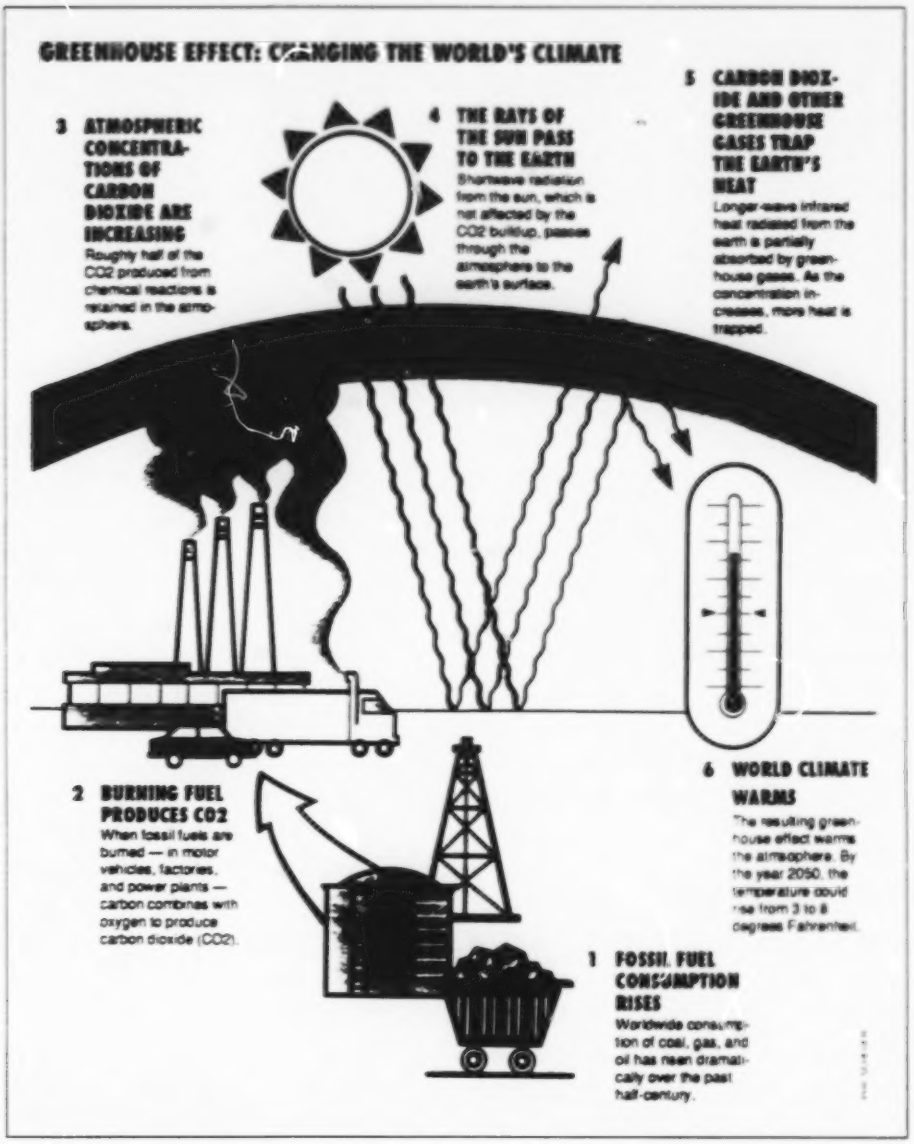
If these predictions prove valid, dramatic changes could take place worldwide. Warmer temperatures, for example, would affect rainfall patterns and agricultural practices. Overall precipitation would probably increase, but droughts could become more common in the Middle West and other areas far from water. Some of the world's best farmland might be lost, while latitudes in the far north could become more productive. Sudden climate change may also lead to the extinction of plant and animal species unable to adapt. Moreover, scientists fear that global warming would raise the level of the world's seas, as polar ice melts and additional heat causes water to expand. Nearly 20 percent of the world's people, as

well as many of the planet's most fragile ecosystems, could be vulnerable to coastal flooding.

Within the scientific community, however, many experts continue to debate the likely extent and consequences of global warming. Some scientists contend that warming will take place at a slower rate than anticipated and so will give humanity enough time to adjust. Others believe that the theory of global warming remains unproven. They emphasize that the global climate is influenced by many factors, and is more complex than the computer models used to predict future global temperatures.

Ozone depletion

Scientists have learned that certain chemicals damage the ozone layer – the atmospheric shield 10 to 25 miles above the earth that prevents much of the sun's ultraviolet (UV) radiation from reaching the surface of the planet. Although ozone in the lower atmosphere is a polluting greenhouse gas, ozone in the upper atmosphere benefits living organisms by blocking damaging sun rays.


GREENHOUSE EFFECT: CHANGING THE WORLD'S CLIMATE
3 ATMOSPHERIC CONCENTRATIONS OF CARBON DIOXIDE ARE INCREASING
Roughly half of the CO2 produced from chemical reactions is retained in the atmosphere.
4 THE RAYS OF THE SUN PASS TO THE EARTH
Shortwave radiation from the sun, which is not affected by the CO2 buildup, passes through the atmosphere to the earth's surface.
5 CARBON DIOXIDE AND OTHER GREENHOUSE GASES TRAP THE EARTH'S HEAT
Longer-wave infrared heat radiated from the earth is partially absorbed by greenhouse gases. As the concentration increases, more heat is trapped.
2 BURNING FUEL PRODUCES CO2
When fossil fuels are burned — in motor vehicles, factories, and power plants — carbon combines with oxygen to produce carbon dioxide (CO2).
6 WORLD CLIMATE WARMS
The resulting greenhouse effect warms the atmosphere. By the year 2050, the temperature could rise from 3 to 8 degrees Fahrenheit.
1 FOSSIL FUEL CONSUMPTION RISES
Worldwide consumption of coal, gas, and oil has risen dramatically over the past half-century.

Many scientists believe that the build-up of carbon dioxide in the atmosphere may lead to a rise in temperatures. This illustration of the greenhouse effect starts with number 1. (Reprinted with permission of the Public Agenda Foundation. Phil Scheuer, graphic artist.)

In 1985, scientists discovered a hole in the ozone layer over Antarctica the size of the continental United States. The climate over the South Pole in the spring creates conditions that promote ozone destruction. Later in the year, the air from the Antarctic ozone hole drifts northward and contributes to a thinning of the global ozone layer. In early 1992, scientists announced that a smaller hole in the ozone layer had opened up over the North Pole. Although conditions in the Arctic are not as favorable to ozone destruction as those in the Antarctic, scientists warned that the threat to humans is significant. People in the northernmost areas of Eurasia, the United States, and

Canada would be especially vulnerable to a further breakdown of the North Pole's ozone layer. In fact, data collected in 1992-1993 indicated that ozone concentrations in the stratosphere had fallen to record low levels over much of the planet.

Chemicals containing chlorine and bromine have been linked to the destruction of the ozone layer. Most significant in the category of chlorine-producing chemicals are CFCs. CFCs are used in refrigeration, air conditioners, aerosols, upholstery, foam insulation, and packing materials. (They also contribute to global warming.) Other harmful chemicals are used in fire extinguishers and industrial solvents. Once these chemicals are released into the atmosphere, they slowly rise into the stratosphere and eat away at the ozone layer for about 100 years.

Ozone depletion could have serious consequences for human health, plants, and sea life. Greater exposure to UV radiation would result in increased rates of skin cancer, cataracts, and immune system problems. Scientists predict that additional UV radiation would also reduce crop yields and harm phytoplankton, the first link in the aquatic food chain.

Although the basic chemistry of ozone depletion is well-established, the effects of volcanic eruptions, ocean temperatures, and weather patterns on the ozone layer continue to puzzle scientists. Nonetheless, research findings have prodded most developed countries to begin phasing out the use of chemicals that destroy the ozone layer. DuPont, the world's leading producer of CFCs, plans to phase out CFC production by the year 2000. Companies that supply refrigeration, air conditioning, and fast-food packaging have also been seeking to develop substitutes for ozone-destroying chemicals.

Acid rain

In the last two decades, scientists have come to understand that air pollution not only affects human health, but damages ecosystems on land and water as well. Particular attention has been paid to the effect of acid rain.

Acid rain results from the pollutants emitted in the combustion of fossil fuels, especially coal. The leading agents of acid rain, sulfur and nitrogen oxides, are released by smokestacks, smelting plants, and automobiles. Once in the atmosphere, these pollutants are converted to acid, then return to the earth's surface in the form of rain, snow, or fog, often hundreds of miles from their source.

In many developed countries, acid rain has damaged the ecosystems of lakes and rivers. Scandinavian countries, subjected to the pollution of both Britain and central Europe, have been particularly hard hit. An estimated 16,000 lakes in Sweden have been severely affected by acid rain. In Canada, more than 150,000 lakes have been similarly affected. Officials in both countries claim that much of the damage is caused by pollution from other countries. Scientists believe that acid rain also damages forests. Excess acids leach nutrients from forest soils and impair the ability of trees to use the remaining nutrients. Trees exposed to acid rain are often less resistant to disease and have discolored needles and leaves. This is a problem particularly in high altitudes, where trees affected by acid rain are often stunted and unhealthy.

In the past twenty years, acid rain has emerged as a controversial international problem among industrialized nations. Germans, who have grieved over the destruction of much of their famous Black Forest, claim that more than half of its acid rain originates elsewhere. Likewise, Canadians point out that the amount of acid rain they receive from the United States is up to four times more than the amount that the United States receives from Canada. Recently, the two neighbors agreed to stricter measures to reduce sulfur emissions.

Greater concern about acid rain has led many industrialized countries to control sulfur oxide pollution by promoting the use of scrubbers in coal plants and other new technologies. In the developing world, however, increased industrialization and automobile use threatens to extend the problem of acid rain to even more areas.

Deforestation and desertification

Since ancient times, people have cleared away trees for agriculture and settlements. The great civilizations of the Mediterranean world devastated the

woodlands of the region. The forests of Britain are one-tenth of the size of the forests that existed there 3,000 to 4,000 years ago.

While forests have actually expanded somewhat in Europe and North America over the past century, the problem of deforestation has worsened in many underdeveloped countries. In areas where rainfall is scarce — amounting to one-third of the earth's land — clearing forests often leads to the spread of desert. These two processes — deforestation and desertification — are closely linked. The root structure of trees holds soil in place and provides nutrients for ground cover. Clearing away trees leaves soil exposed to the full force of rain and wind. Poor farming practices and short-sighted irrigation methods also lead to soil erosion. Livestock further degrades the land by eating young plants and leaving behind hard-packed trails and gullies.

Every year, approximately 70,000 square miles of land are damaged beyond agricultural use. In the 1930s, grasslands of the American Great Plains that had been plowed up during the previous decade were turned into a dust bowl by drought. Today, productive land is being lost to desert primarily in Africa, where 26 percent of the continent is undergoing some form of desertification. At the same time, tropical forests are suffering as well. In Brazil, which contains 26 percent of the world's tropical forests, trees have been cleared in the Amazon River basin for cattle ranching, logging, and agriculture. Without a protective canopy of dense vegetation, tropical soils are quickly leached of their nutrients by heavy rains and the equatorial sun. Since tropical forests absorb much of the atmosphere's carbon dioxide and release large amounts of carbon dioxide when burned, their loss could speed up the pace of global warming.

Decline of biodiversity

As humanity has moved into areas that were once wilderness, the rate of extinction among plants and animals has rapidly increased. Some biologists predict that the earth may lose one-fifth of its existing species in the next 20 years. Any loss of biodiversity — the range of life on the planet — is beyond human power to replace. Potential sources for new medicines and technologies are also lost.

Concern for preserving biodiversity centers particularly on areas that are rich in wildlife, such as tropical rainforests. Although tropical rainforests cover only 6 percent of the earth, they contain over half the world's species. These areas have been stripped of their trees at an accelerating rate. Every year, more than 40 million acres of tropical rainforest — an area the size of Washington state — are lost, as well as 4,000 to 6,000 tropical species. Other species-rich habitats are also endangered. Wetlands in the United States, Australia, New Zealand, and elsewhere have been damaged by industry and agriculture. Mangrove swamps, particularly in developing countries, are vanishing. Fisheries in the United States and Canada report a loss of freshwater fish species in North America.

Environmental organizations in developed countries have been largely responsible for laws protecting endangered species. Beginning in the 1970s, the United States took the lead in adopting environmental legislation. The Alaska National Interest Lands Conservation Act of 1980 set aside an area larger than California to preserve Arctic wildlife. Protecting wildlife, however, has also sparked protest from industries, such as timber and energy, which are barred from protected areas.

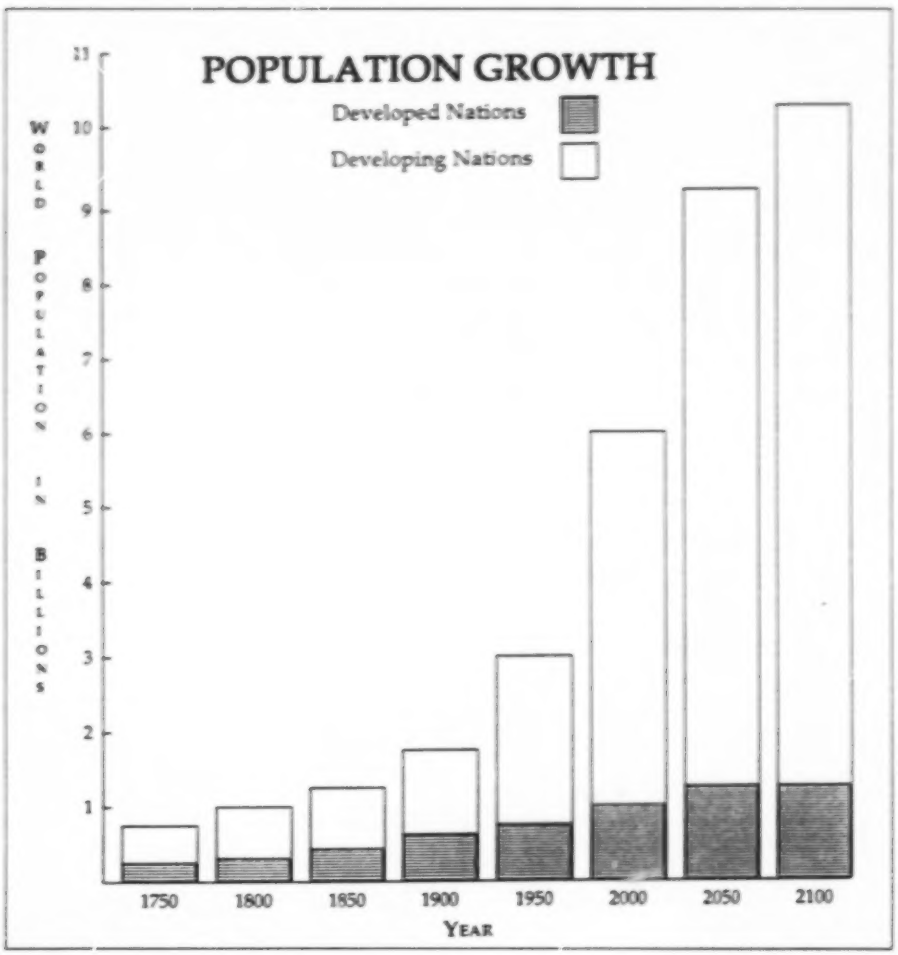
Many developing countries, such as Rwanda and Kenya in Africa, are attempting to protect wildlife by expanding their parks and preserves, particularly areas that contain species popular with tourists. The celebrated work of Jane Goodall, Dian Fossey, and other scientists on African primates has resulted in stricter laws to protect the habitat of chimpanzees and mountain gorillas. In parts of Africa, however, poor countries have had trouble maintaining preserves and enforcing anti-poaching regulations.

Population Pressures

The development of agriculture 5,000 to 8,000 years ago set the stage for a gradual increase in human population. In ancient times, it took 2,000 years to double the population of the world. Since 1900, though, the world population has more than tripled.

Europe's population grew rapidly during the 18th and 19th centuries, while population growth in much of Asia, Africa, and Latin America has accelerated during the 20th century. Improvements in sanitation, medicine, and food production have all contributed to the decline in death rates. At the same time, new agricultural techniques have enabled many countries to significantly increase their food production.

The current population of the world is 5.5 billion. One billion people are added every ten years. Almost 95 percent of this growth is occurring in developing countries. Population figures alone, however, are only part of the story concerning humanity's impact on the environment. Perhaps equally important are rates of consumption by people in different parts of the world. In the developed world, where there is little population growth, people use a much greater proportion of the world's resources than their counterparts in developing countries. For example, an American uses 36 times more commercial energy (energy that is produced and sold) than an Indian.



Although population growth in developed countries has leveled off, the number of people in developing countries is expected to increase rapidly until the middle of the 21st century. (Data from *Population Bulletin*, vol. 42, no. 2.)

Industrialization

Understanding the division between the industrialized, or developed, world and the non-industrialized, or developing, world is critical to the discussion of global environmental problems.

For most developed countries of the world, such as the United States, Japan, and the nations of Western Europe, industrialization has raised living standards to levels previously unknown in human history. For many developing countries, industrialization has become a goal. Billions of people in these countries hope to one day enjoy a lifestyle often taken for granted in the

United States. For the planet as a whole, however, industrialization has fundamentally changed the relationship between humanity and the environment. If the developing world were to follow the pattern of industrialization pursued by wealthy nations over the past two centuries, scientists fear that the earth would be unable to support the increased level of consumption.

Many of the environmental problems associated with industrialization are caused by the use of fossil fuels. In the 17th century, the major energy source for England was wood. But with the onset of industrialization in the late 1700s, most forests were cleared and coal was increasingly used to meet the country's ever-growing appetite for fuel. In the 1800s, coal mining was expanded and oil-drilling techniques were developed. By the turn of the century, the United States had taken the lead in forging an industrial economy powered by coal and oil.

Today, these two fossil fuels, along with natural gas, supply 88 percent of the world's energy. As developing countries have taken steps toward industrialization, they too have drawn up plans based on fossil fuels.

The availability and versatility of fossil fuels have earned them a prominent place in the modern world. Petroleum products, for example, can provide heat, generate power, and fuel vehicles. However, oil contributes to air pollution and global warming by releasing greenhouse gases and other pollutants. Americans are particularly dependent on oil. Although the United States is the second leading producer of oil in the world, consumption far exceeds production. In 1991, U.S. petroleum usage for transportation alone exceeded the total production of oil in the United States by 24 percent. Coal, which produces more pollution than other fossil fuels, has an even closer relationship with industrialization. The world has more coal reserves than oil or natural gas. Coal's relatively low cost has also made it attractive for poor countries on the road to industrialization. China, for example, generates 76 percent of its commercial energy from coal, making it the third largest contributor

Environmental Terms

Greenhouse gases: Gases – such as carbon dioxide, methane, nitrogen oxides, and chlorofluorocarbons – that keep the earth's heat from escaping through the atmosphere.

Carbon dioxide (CO_2): A greenhouse gas which helps maintain the warmth of the planet by trapping infrared radiation. Since the Industrial Revolution, the amount of CO_2 in the atmosphere has increased by 25 percent.

Fossil fuels: Oil, coal, and natural gas that were formed from plants and animals that lived millions of years ago. Fossil fuels supply 88 percent of the world's energy.

Ozone layer: A shield of ozone (O_3) molecules 10-25 miles above the earth that blocks much of the sun's harmful ultraviolet radiation.

Chlorofluorocarbons (CFCs): Man-made chemical compounds used in refrigeration, insulation, foams, and a number of industrial processes. When CFCs reach the stratosphere, they release chlorine atoms that damage the ozone layer.

Sulfur dioxide (SO_2) and nitrogen oxides (N_xO): The leading agents of acid rain. They are released through the burning of fossil fuels and organic matter.

Tropical forests: The band of dense vegetation covering much of the equatorial region that is home to more than half the world's plant and animal species. Cleared of tree cover, the thin soils of tropical forests are vulnerable to erosion caused by the heavy rainfall and intense sun of the tropics.

Endangered species: Species of plants and animals that face extinction because of human activity. Under the Endangered Species Act, plants and animals in the United States under threat are identified and protected.

Methane (CH_4): Also known as natural gas, methane is produced through bacterial activity in rice paddies and in the digestive tracts of cud-chewing animals, such as cows, and certain insects. CH_4 is twenty-five times more effective at trapping heat in the atmosphere than CO_2.

of carbon dioxide emissions – behind the United States and the former Soviet Union.

The Industrial Revolution has also reshaped the nature of agriculture. New varieties of plants and improvements in technology have allowed farmers to expand the land area under cultivation worldwide by 450 percent in the past 300 years. Farmers today, even in developing countries, often rely on gasoline-powered vehicles and agricultural chemicals. These changes in the countryside have led to higher emissions of greenhouse gases. As more and more wilderness has been used for cattle ranching and rice paddies, the amount of methane gas in particular has increased worldwide. Methane gas is produced by bacteria in the stomachs of livestock and in the soil of rice paddies. Other sources of methane include landfills, swamps, mining, and leaking gas pipelines. Although methane molecules last for only seven to ten years (compared to 500 years for carbon dioxide), methane retains heat in the atmosphere more efficiently than carbon dioxide. Concentrations of methane in the atmosphere are increasing at four times the rate of carbon dioxide. Scientists estimate that methane accounts for between 12 to 20 percent of global warming.

Dilemmas of economic development

Different regions, different problems

Concern about the environment is a new phenomenon for most of the world. Throughout most of the 19th and 20th centuries, leaders in the developed world paid little attention to the long-term consequences of industrialization. European countries competed to establish colonies abroad, eager for abundant supplies of raw materials and new markets for their manufactured goods. By the turn of the century, almost all of Africa and much of Asia were under the control of Britain, France, and other European powers. Although most of the colonies gained independence after World War II, these countries continued to provide raw materials for the factories of Europe while serving as markets for manufactured goods. The economies of the United States and Latin America were similarly linked.

Today, the relationship between the colonial past, economic development, and the environment has emerged as a pressing issue. Although each country has responded differently to these problems, observers have divided the nations of the world into four broad categories according to their economic and environmental concerns.

The developed world consists of the most advanced industrialized nations, including the United States, Japan, and Western Europe. The developed world consumes the bulk of the world's resources, while producing more than half of the world's wealth. In the process, the developed world has been primarily responsible for the pollutants that contribute to global warming, ozone depletion, and acid rain. The United States alone is responsible for 20 percent of the world's carbon dioxide emissions.

As the area that industrialized first, the developed world has experienced many of the planet's worst environmental problems. Coal use in Britain, for example, left many of the country's cities black with soot and led to severe health problems. As late as 1952, smog was responsible for the deaths of more than 4,000 people in London. In recent decades, however, successful efforts have been made to reduce the severity of air and water pollution problems throughout the developed world.

The former Soviet bloc – mainly the countries of the former Soviet Union and Eastern Europe – suffers from many of the worst features of industrialization. Under communism, the former Soviet bloc underwent a crash program of industrial development. Although progress was achieved in heavy industry, these countries failed to reach the prosperity found in the developed world. They also lacked the means to clean up many of their most serious environ-mental problems.

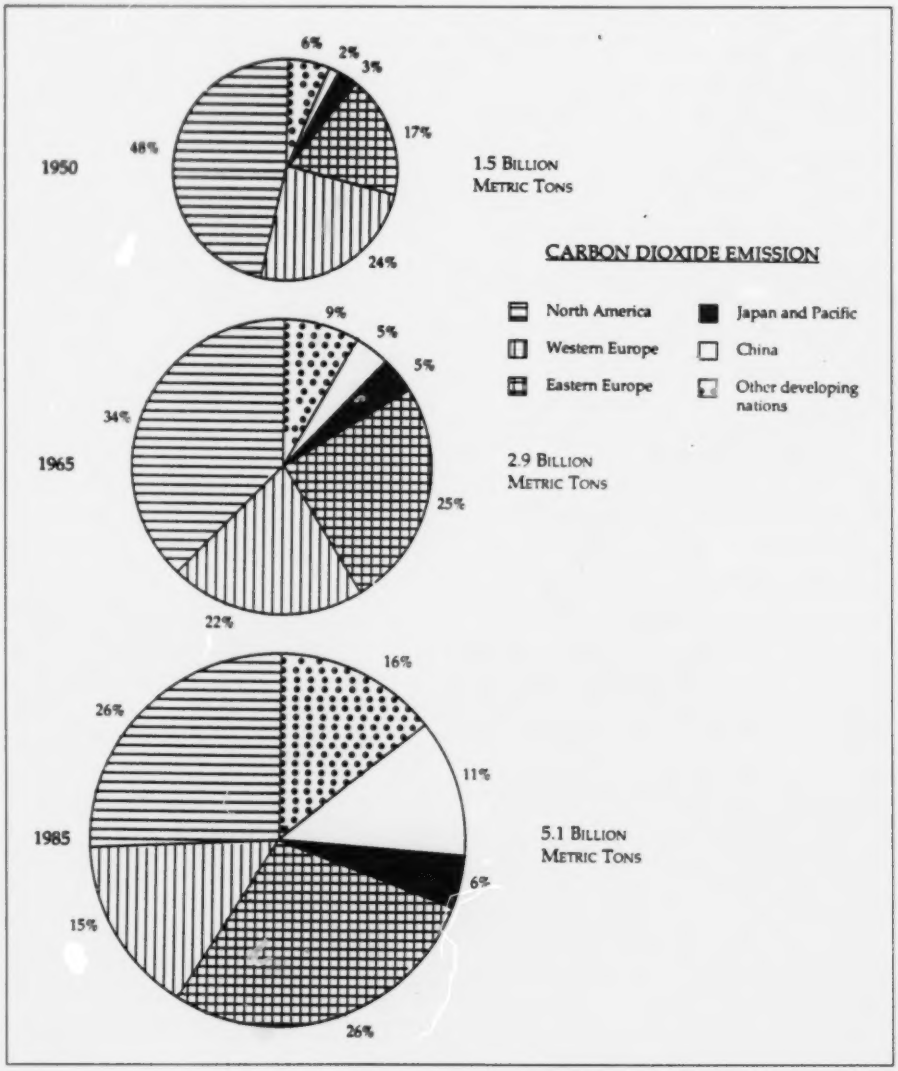
Much of the former Soviet bloc relies on poor-quality, high-polluting coal and backward, energy-inefficient technologies. In Russia, for example, government subsidies have kept energy prices artificially low and have encouraged waste. As a result, Russian factories used twice as much energy as their American counterparts for the same output. Meanwhile, energy producers have lacked the resources to

upgrade their equipment. Russian energy officials estimated in 1993 that 25 percent of the country's natural gas production was lost to leakage and inefficiency. Nuclear power facilities also pose a serious threat in much of the former Soviet bloc. The explosion within a nuclear reactor at Chernobyl in the former Soviet Union in 1986 heightened fears about more than a dozen similarly designed facilities.

Newly industrializing countries consist mostly of nations in Asia and Latin America that have embarked on economic programs emphasizing rapid industrial development. Success stories for this approach include South Korea and Taiwan. Other countries, such as Mexico, China, India, and Brazil, are pursuing a similar course. Many of these countries have made progress in curbing population growth and are now anxious to catch up with the developed world. In the process, they have turned largely to fossil fuels to transform their societies and are increasing their emission of greenhouse gases.

In many cities of newly industrializing countries, pollution rivals the worst period of industrialization in the United States and in Europe. Cities like Jakarta, Indonesia and Calcutta, India suffer from thick smog caused primarily by the burning of poor-quality coal and organic matter. Many developing nations, such as Mexico and Brazil, have increased their use of private cars but lack fuel efficiency standards and air quality regulations. In March 1992, Mexico City experienced record levels of smog and was forced to enact emergency measures. Children were kept home from school and factories were required to cut production by 50 percent.

The underdeveloped world consists of the poorest countries of the world, located mostly in Africa and South Asia. Environmental problems in the underdeveloped world are caused less by industrialization than by growing numbers of people struggling for survival. Despite foreign aid, famine and disease are common in these countries. Since the population of



Carbon dioxide emissions more than tripled between 1950 and 1985, increasing at a particularly rapid rate outside of North America and Western Europe. (Data from the World Resources Institute.)

many underdeveloped countries is rising rapidly, pressure on resources will continue to mount. Deforestation, desertification, and declining biodiversity are widespread, as more and more people rely on the land for food and fuel.

The past two decades in the Sahel region of Africa have tragically illustrated the crisis facing much of the underdeveloped world. The Sahel is an arid region located on the southern fringe of the Sahara desert. Abundant rainfall in the 1950s and 1960s led to increased farming of high-priced export crops, such as peanuts. People moved from areas in the south to cultivate crops on lands of the Sahel that had not been farmed for centuries. As more land was used for export crops, less was available to grow basic staples and graze livestock. The over-cultivation and overgrazing in this fragile area robbed the soil of nutrients and led to erosion. When a stubborn drought began in the early 1970s, the land was unable to support the people and animals. Tens of thousands of people in Ethiopia, Sudan, and elsewhere in the Sahel have starved as a result. The famine that struck Somalia in 1992, prompting U.S. troops to intervene to protect relief efforts, was brought on in part by the Sahel's desertification.

Attitudes toward environmental issues

Wealthy, developed countries were responsible for placing environmental problems on the international agenda in the early 1970s. Today, many of these countries are attempting to address global environmental threats in international forums. Public opinion polls taken in Europe, Japan, Canada, and the United States have found that people in these countries rank the environment as one of the top five most important issues in the world.

The former Soviet bloc countries have only recently begun to focus on environmental problems. The Chernobyl disaster resulted in increased awareness of environmental problems and spurred the development of environmental organizations in many countries of the former Soviet bloc. Since the collapse of the Soviet Union in 1991, however, economic and political problems have overshadowed the environment. Former communist countries are attempting to adjust to a new political order and stimulate their stagnant economies.

Newly industrializing countries are also chiefly concerned with economic development. Many of these countries believe that wealthier countries should provide financial assistance to help industries adjust to new environmental concerns. China and India, for example, have insisted that developed countries provide assistance as compensation for their cooperation in phasing out technologies that use CFCs.

Countries of the underdeveloped world have likewise looked to wealthier countries to assist their development. Because of the dire conditions facing the underdeveloped world, many of these countries are more open to far-reaching global programs. Bangladesh, the islands of the Maldives, and other low-lying countries are particularly concerned that rising sea levels resulting from global warming may inundate their countries. In response to this threat, the 37-member Alliance of Small Island States is pressing for swift action to curb emissions of greenhouse gases. Nonetheless, many in the underdeveloped world also fear losing control over their natural resources to wealthier countries. For example, underdeveloped countries want a share of the profits from new agricultural, medical, and industrial products derived from species within their borders.

Assessing the Earth Summit

In June 1992, representatives from 178 countries took part in the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. The twelve-day meeting was the largest gathering of national leaders in history. The conference, known as the Earth Summit, also attracted 10,000 scientists and environmental activists, as well as 8,000 journalists.

The Earth Summit came on the 20th anniversary of a UN conference in Stockholm, Sweden, that marked a breakthrough in international efforts to address global environmental problems. But while only two heads of state participated in the Stockholm Conference, more than 100 attended the gathering in Rio de Janeiro. Moreover, the Earth Summit produced agreements that raised environmental issues to a new level of international importance. Treaties on global warming and biodiversity call on the more than 150 nations that signed them to curb emissions of greenhouse gases and protect endangered species of plants and wildlife. Earth Summit delegates also approved a comprehensive program of action — Agenda 21 — for achieving a balance between economic development and protection of the environment.

But while the Earth Summit brought together the greatest number of world leaders ever assembled, it also illustrated the obstacles to international cooperation on environmental matters and highlighted the divisions between developed and developing countries. Until recently, the dividing line in international relations was marked by the hostility of the Cold War between the United States and the Soviet Union. Since the collapse of the Soviet Union, however, the struggle pitting West against East has faded. Instead, international politics are increasingly dominated by the contest between the developed nations of the North and the developing countries of the South. Much of what happened at the Earth Summit was shaped by North-South tensions.

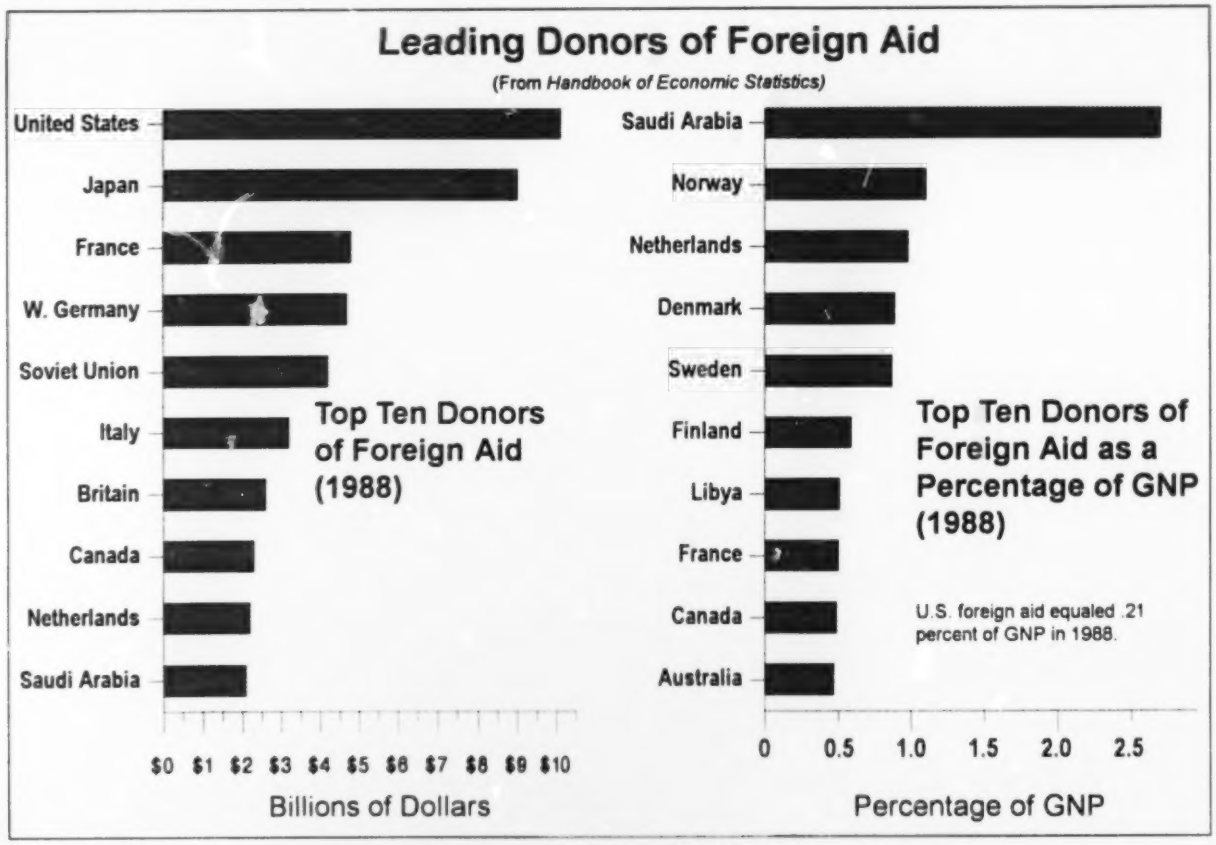
Most developed countries had hoped that the Earth Summit would be devoted exclusively to protecting the environment. In contrast, nations of the developing world looked upon the conference as an opportunity to address the enormous gulf in wealth that separates the North from the South. The two years of negotiations leading up to the Earth Summit succeeded in bridging some of the differences, but a number of issues remained unresolved.

Foreign aid

At the center of controversy was the issue of foreign aid. Maurice Strong, the secretary general of the Earth Summit, estimated that $125 billion in aid would be needed annually to implement the conference's recommendations. Raising such a sum would require developed countries to increase foreign aid spending by 70 percent. To meet Strong's appeal, a number of Western European countries pledged at the Earth Summit to contribute 0.7 percent of their gross national product to development assistance by the year 2000. Germany and Britain, however, refused to renew earlier commitments to reach the UN goal. The United States has never endorsed the target.

Japan emerged as the leading contributor of environmental aid at the Earth Summit by pledging to give $7.7 billion over five years — an increase of $500 million annually over Japan's 1992 aid budget. The United States, Britain, and Germany were less forthcoming. As government leaders noted, foreign aid budgets in these countries were being squeezed by the recession and appeals for help from former Soviet bloc countries. The problems in what was once East Germany left the German government with a particularly heavy burden.

In general, developing countries came away from the Earth Summit disappointed by the offers of financial assistance from wealthier nations. Not only have these nations campaigned for increased funding and new technology, but they have also pressed for a larger voice in determining how foreign aid is spent. Many have called into question the effectiveness of conventional economic aid, pointing specifically at the World Bank and the International Monetary Fund. These two institutions were created at the end of World War II and have distributed much of the



economic aid provided by the United States and other wealthy countries.

Leaders of the developing world contend that the World Bank promotes the interests of wealthy donor nations. At the Earth Summit, China and India led a coalition of developing countries seeking support for a new "Green Fund" that would be administered by both rich and poor nations. In addition, developing countries and environmental activists have asserted that the World Bank has often overlooked environmental considerations and even contributed to ecological damage. A hydropower project in Brazil financed by the World Bank, for example, has harmed the ecosystem in large areas of the Amazon Basin.

Developed nations maintain that poor countries should do more to help themselves. Governments in the developing world, for example, have been criticized for providing their people cut-rate prices on electricity and irrigation water. Selling natural resources too cheaply, according to most analysts, encourages inefficiency, waste, and pollution. At the time of the Earth Summit, President Bush argued that the U.S. contribution of $175 million for environmentally sound development was adequate. Bush emphasized the need for a free-market approach to environmental management and less government regulation.

Debate over the transfer of technology was also part of the struggle between North and South. Leaders of developing countries pressed their counterparts from the developed world to provide them with environmentally sound technology as part of their foreign aid. In contrast, developed countries want to make a profit on the products and services they create to protect the environment.

Earth Summit agreements

Many aspects of the North-South dispute can be found in the Earth Summit's main document – Agenda 21. The 800-page set of guidelines covers both the environment and economic development, while avoiding many of the thorniest issues. Population

growth was hardly mentioned, due to pressure from developing countries. Meanwhile, developed nations sought to protect corporations that operate in many countries from new regulations. Putting Agenda 21 into practice presented more problems. A 53-nation United Nations body — the Commission on Sustainable Development — was created to hold governments accountable for implementing Agenda 21. The commission, however, has no enforcement power, other than international pressure.

In addition to Agenda 21, the Earth Summit produced two legally binding treaties: the Framework Convention on Climate Change and the Convention on Biological Diversity. The climate change treaty focused on limiting the output of greenhouse gases. Western European leaders initially sought to require signatories of the treaty to cut back carbon dioxide emissions to 1990 levels by the year 2000. U.S. negotiators, however, lobbied against the proposed deadlines, arguing that the regulations would hurt industry and threaten jobs.

Economic concerns also complicated negotiation of the biodiversity treaty. Developing countries insisted that the convention should guard their property rights over the genetic resources within their territory. President George Bush, however, feared that the treaty would allow foreign countries to claim a share of the research, profits, and technology of U.S. biotechnology companies. Moreover, the United States, Japan, and Britain objected to the convention's efforts to impose additional regulations on the release of genetically engineered organisms. Despite international pressure, the United States refused to join 153 other countries in signing the biodiversity treaty.

The United States and other developed countries had originally intended to craft a strong treaty on deforestation. With backing from the United States, negotiators proposed a ban on logging in tropical forests. Many developing countries, however, balked at sacrificing economic growth for environmental concerns. India and Malaysia, for example, campaigned against measures that would have regulated their tropical wood industry. Instead, they put forward proposals that logging be restricted in the forests of the developed world. Unable to agree on a legally binding convention, participants at the Earth Summit instead endorsed a statement of principles on preserving the world's forests.

In 1993, President Bill Clinton reversed many of the positions the Bush administration took at the Earth Summit. Clinton committed the United States to meeting the deadline for cutting carbon dioxide emissions. He also signed the biodiversity treaty. In addition, the president pledged U.S. support for proposals to give poor countries a greater voice in shaping foreign aid programs.

In a speech to the first important meeting of the UN Commission on Sustainable Development in June 1993, Vice President Al Gore asserted that the United States and other wealthy countries had a special responsibility to address global environmental problems. "A child born in the United States," Gore said, "will have, in his or her lifetime, 30 times more impact on the earth's environment than a child born in India."

The environment in the international arena

Since June 1992, a worldwide recession and conflict in Somalia and what was once Yugoslavia have drawn international attention away from the environment. Participants in the conference, however, agree that the Earth Summit represented a milestone for international involvement in environmental matters. Equally important, the Earth Summit helped to define a relatively recent issue in world politics.

The concept of global environmental concerns has emerged in the international arena only in the last few decades. For the first time in history, science and technology have given humanity the ability to reach virtually every spot on the globe — from the deepest oceans to the polar ice caps. At the same time, countries in both the developed and developing world have come to recognize the trade-offs and limits of economic growth. As advances in technology and population growth have combined to change humanity's relationship with nature, environmental issues have increasingly entered the domain of international relations.

Over the past few decades, the scope of international agreements on the environment has

gradually broadened to cover areas of common concern to humanity. From treaties dealing with the use of the oceans, the international environmental agenda has expanded to include Antarctica, the atmosphere, and the ozone layer. Many environmental activists eventually hope to apply international agreements to the entire planet. Now that the oceans have been recognized as humanity's common heritage, these activists are pressing the international community to regard the world's forests, lakes, and other natural ecosystems in the same way.

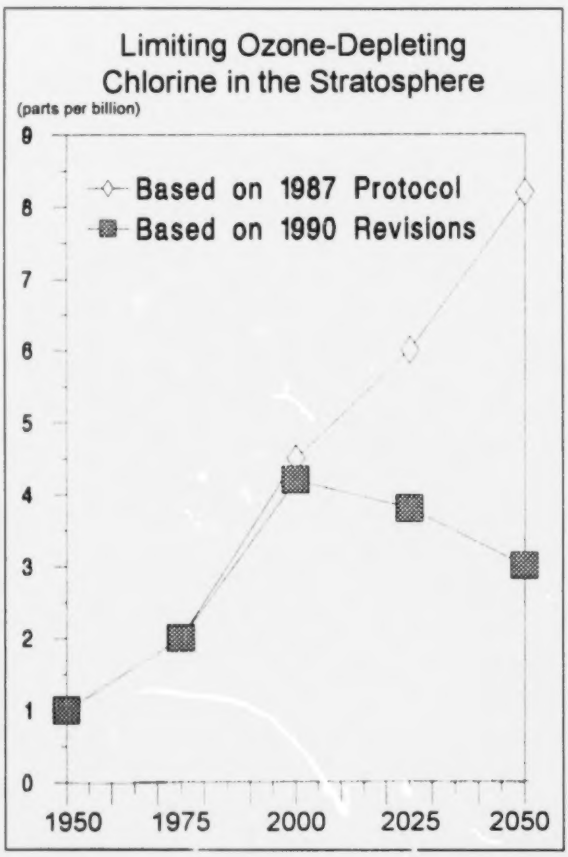
Like the Earth Summit itself, however, international environmental efforts over the past two decades have often been framed by North-South friction. At the 1972 Stockholm Conference, the United States and other developed countries sought to create an international environmental agency to set global standards. Developing countries, however, suspected that programs to reduce pollution would limit their control over their own natural resources and interfere with plans for economic growth.

In the end, the Stockholm Conference produced a statement of principles that focused on the responsibilities of each nation to protect the global environment. Since then, there has been an increase in bilateral, regional, and international agreements on environmental issues. However, given the lack of enforcement at the international level, these agreements seldom have been strictly observed. Moreover, many leaders in the developing world have rejected what they see as roadblocks in the path to economic development.

The United States and Mexico, for example, have found themselves in disagreement over Mexico's tuna fishing industry. In 1990, Congress enacted legislation that forced the U.S. tuna industry to give up driftnet fishing – a practice that efficiently catches tuna but also drowns thousands of dolphins. Although most countries sought to meet U.S. standards for protecting dolphins, the tuna industries of Mexico and two other nations failed to comply.

In accordance with the 1990 law, American environmental organizations made sure that an embargo was imposed on Mexican tuna. Mexico, however, countered by arguing that the U.S. embargo obstructed free trade, and it won a favorable decision from the body that oversees international trade. Nonetheless, the Mexican government ordered fishermen to stop catching tuna with driftnets in order to protect Mexico's image in the United States.

Another North-South controversy has surfaced around efforts to protect the ozone layer. The first agreement to limit production of CFCs – the Montreal Protocol – was signed in 1987. Scientific evidence that ozone depletion was a greater threat than anticipated led to a stricter agreement in 1990. These measures called on developed countries to phase out CFCs and methyl chloroform by the year 2000. China and India, however, initially refused to sign the agreements. Both countries had invested in CFC technology as part of their plan to promote economic development. As an incentive to gain the participation of China, India, and other newly industrializing countries in the agreement, a $240 million fund was created in 1990 to help developing nations shift to other technologies. Developing nations were



also given an additional ten years to phase out ozone-depleting chemicals.

In 1992, further evidence of the destruction of the ozone layer resulted in still stricter measures. Germany, Denmark, and the Netherlands agreed to halt the production and use of ozone-depleting chemicals by 1994; the twelve-nation European Community by 1995; and the United States by 1996. Worldwide, CFC production has already fallen more than 40 percent since 1987. Meanwhile, pressure on developing countries that are still producing CFCs has continued to mount.

Among the nations most vulnerable to environmental abuses are the poor countries of the underdeveloped world. The international trade in hazardous waste disposal serves to illustrate the problem. As developed countries have tightened their own pollution laws, producers of hazardous wastes have turned to poor countries to find inexpensive dumping grounds. One of the most highly publicized examples occurred in 1988, when Nigerian authorities refused to accept a ship loaded with chemical wastes from Italy.

Such incidents spurred poor countries to call for a worldwide ban on the dumping of hazardous wastes outside of the source country. The United States, Japan, and several other developed countries, however, opposed a complete ban on international shipments of hazardous wastes. The agreement that finally emerged from negotiations called for greater regulation. Neither the United States, which criticized the restrictions, nor many African countries, which advocated a total ban, have voiced enthusiasm for the treaty.

Part IV: The U.S. Role in Global Environmental Politics

The U.S. position

No country has as much impact on the global environment as the United States. With 5 percent of the world's population, the United States consumes 25 percent of the world's energy and produces 25 percent of the world's output of goods and services. In the area of international relations, the United States has occupied center stage since the 1940s and has played a prominent role in environmental affairs.

Indeed, the United States can take credit for supplying much of the early initiative to address global environmental problems. Within the American public, concern over air and water pollution surfaced as an important political issue in the 1960s. The passage of the National Environmental Policy Act and the creation of the Environmental Protection Agency in 1970 served as a model for other developed countries. Public sentiment also prompted the United States to take the lead at the 1972 Stockholm Conference.

During the 1980s, however, the U.S. position on environmental problems has shifted in international forums. The election of Ronald Reagan as president in 1980 brought a more conservative outlook on environmental issues to the White House. President Reagan, and later George Bush, sought to reduce governmental regulation of the economy. As a result, many environmental restrictions came under scrutiny.

Under President Bush, the Clean Air Act was strengthened in 1990. In contrast to environmentalists, however, Bush favored granting industry flexibility in choosing pollution-control equipment and meeting deadlines. Bush also defended his stance at the Earth Summit to limit U.S. contributions to international aid programs. Meanwhile, other developed nations moved to the forefront of environmental efforts. By 1992, limits on air pollution in Japan and Germany were nearly four times as stringent as those in the United States.

Since his election, President Clinton has redirected U.S. environmental policy. Unlike President Bush, Clinton believes that the United States can profit from developing environmentally sound technologies. Warning that Japan and Germany are moving quickly to capture the so-called "green market," Clinton has pushed for greater U.S. investment in this field. In addition, he has promised to strictly enforce laws aimed at controlling pollution.

Clinton's initiatives include a proposed partnership between the government and American automakers to produce vehicles that are powered by fuel cells and other non-polluting energy sources. General Motors, Ford, and Chrysler, in fact, have already begun developing engines that are not fueled by gasoline. The research of the automakers was prompted in large part by a California law that requires companies to sell cars in the state that do not pollute the air by 1998.

President Clinton's commitment to restore American leadership on global environmental issues has also resulted in changes in U.S. policy to meet international standards. In 1993, the Clinton administration presented a plan to reduce carbon dioxide emissions in line with the Earth Summit's climate change treaty. At the same time, a special council was created to prepare a broad strategy on sustainable economic development to conform with the recommendations of Agenda 21. The strategy will be ready in 1994.

Weighing the place of government

Both supporters and opponents of President Clinton's environmental policy recognize that environmental concerns cannot be separated from economic matters. Although Clinton views the relationship as an opportunity, others see a dilemma. The contrasting perspectives are part of a larger debate on humanity's record in the modern age.

In the past two centuries, science and technology have brought solutions to many of our age-old problems. Advances in medicine have reduced the threat of deadly disease. Progress in agriculture and industry has made headway in the struggle against hunger and poverty in much of the world. Each step forward, however, has brought with it unforeseen consequences.

When CFCs were invented around 60 years ago, they were hailed as a safe alternative to ammonia and other dangerous coolants used in refrigerators. No one imagined that the same chemicals posed a threat to the ozone layer. By the same token, the "green revolution" that transformed agriculture in much of southern Asia and Latin America in the last few decades has proved to be a double-edged sword. Reliance on chemical pesticides and fertilizers boosted crop yields, but also led to serious land and water pollution.

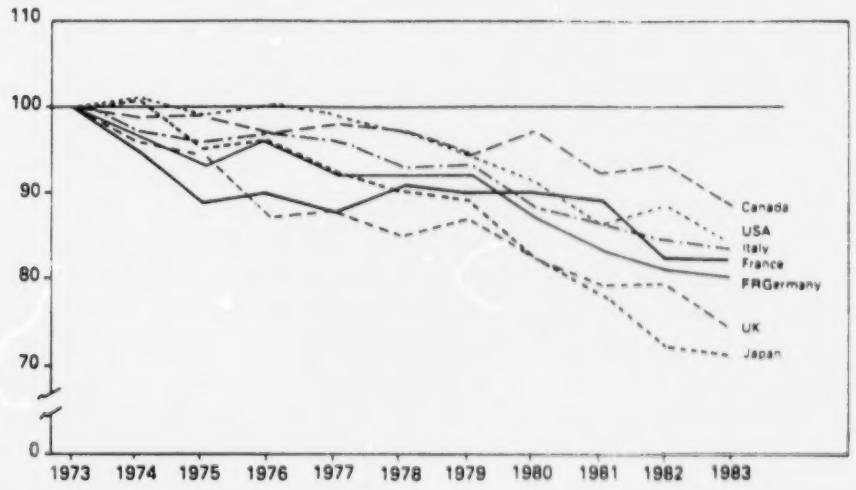
As a world leader in science and technology, the United States has long dealt with the dilemmas of modern society. The growing prominence of environmental issues, however, has led many Americans to focus greater attention on the government's role in tackling environmental problems.

The United States already spends more money on the environment — just over 2 percent of the gross national product — than any other country. Most of that spending is done by businesses in response to government regulations. The 1990 Clean Air Act, for example, focuses on reducing industrial emissions of sulfur dioxide, nitrogen oxides, and other chemicals.

Some officials believe new taxes will reduce pollution and increase economic competitiveness. Governments have long imposed heavy taxes on products that are considered harmful, such as alcohol and tobacco. These "sin" taxes are aimed at discouraging consumption. Based on similar reasoning, five European countries have introduced taxes on the carbon content in fossil fuels.

Advocates of a carbon tax in the United States note that taxes on gasoline in this country are a fraction of those in Western Europe and Japan. Germans, for example, pay about $1.50 in taxes for a gallon of gasoline, while French taxes total more than $2 a gallon. Environmentalists contend that a carbon tax would not only spur conservation, but would also raise revenue to support other environmental programs. The logic behind a carbon tax could also be applied to other pollutants, such as sulfur and nitrogen oxides. Opponents of the plan fear the economic impact of pollution taxes. They contend that a carbon tax would fall heaviest on poor and middle-income automobile owners.

In 1993, discussion of an energy tax was at the center of the debate on President Clinton's proposed five-year budget package. After rejecting a carbon tax, Clinton advocated a general tax on all energy as the fairest approach. Senators from Louisiana, Oklahoma, and other energy-producing states, however, argued that the tax would impose a heavy penalty on their local economies. To gain approval in Congress for the budget package, Clinton's allies accepted a proposal to increase the gasoline tax by 4.3 cents a gallon. Supporters of the compromise, however, conceded that the gasoline tax would do little to promote energy conservation.



Since the 1973 oil embargo, developed countries have reduced the amount of energy required for economic production. (From *The State of the Environment*.)

On an even broader scale, some officials have called on the government to take a more active role in promoting environmentally sound technologies. Business executives are attracted to the prospect of trailblazing new industries. They note that the Japanese government is already investing in technologies designed to be environmentally friendly.

Some business leaders want the United States to follow the lead of Japan, where

corporations are urged to prepare for a new area of international competition by exceeding the environmental standards of foreign countries where they operate. At the same time, American scientists are looking forward to greater funding for research projects that promise a greener future. They point to earlier partnerships between government and scientists that achieved success – such as the project to develop an atomic bomb and the program to land an astronaut on the moon.

As critics of such proposals point out, however, government has little money for new initiatives. Moreover, they are wary of government interference in the economy. Particularly worrisome to them is a government hand in picking winners and losers among emerging technologies. Opponents of government involvement argue that free market competition is a better decision-maker.

Energy and the Environment

In the debate over the government's role in environmental matters, energy stands out as a leading issue. Particularly important are government policies on conservation and new technologies.

In the developed world, fossil fuel use has held steady over the past two decades. Energy conservation has been the key factor. The major turning point came in 1973, when oil-producing Arab states cut off oil shipments to the United States to protest U.S. military aid to Israel. The embargo convinced the oil producers that higher prices could be maintained if they limited production. During the 1970s, the strategy worked. Oil prices soared from as low as $1 a barrel at the beginning of the decade to over $30 a barrel by 1979. Prices for other fossil fuels also increased.

In the United States and other developed countries, higher energy prices spurred new conservation measures in the 1970s. President Richard Nixon lowered the national speed limit to 55 miles an hour; consumers bought cars with better gas mileage; and industries improved fuel efficiency. Conservation efforts were accepted much as they had been during World War I and World War II. With the fall of energy prices since the mid-1980s, however, progress on conservation has slowed. Gasoline prices are now comparable to prices before 1973. In recent years, Americans have been driving more and buying less fuel-efficient cars.

Meanwhile, Western Europe and Japan have continued to make strides in conservation. Germans and Japanese, for example, use half as much energy per person as Americans and are ahead of the United States in promoting energy-efficient industry and recycling. Worldwide, however, fossil fuel use has continued to rise. Rapidly industrializing countries account for much of the increase. By 2020, the developing world as a whole is expected to consume 40 percent of the world's fossil fuels, up from the current level of 28 percent.

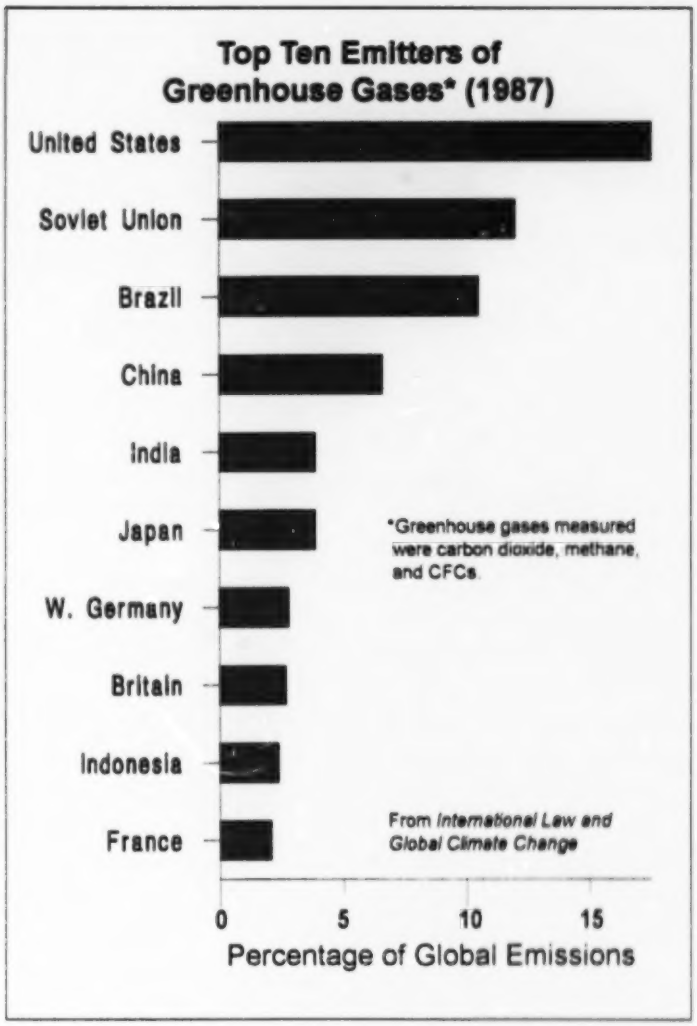
Aside from conservation, the world could reduce greenhouse gas emissions by substituting natural gas for oil and coal. Although natural gas is a fossil fuel, it produces much less pollution than oil or coal. Natural gas currently provides one-fifth of the world's commercial energy, and usage could double by the year 2010. Much of the world's untapped natural gas, however, lies in remote, unspoiled locations.

Alternatives to fossil fuels

While strides in conservation continue to be made, advances in new energy technologies hold promise as well. Alternative technologies offer a vehicle for reducing our dependence on oil, coal, and natural gas, but they also raise questions of cost and feasibility.

Nuclear power, for example, was acclaimed as a source of clean, safe, inexpensive energy by many after World War II. Since then, experience with nuclear fission, which releases energy by splitting the nuclei of atoms, has raised concerns about the dangers of the radiation and nuclear wastes produced in the process. Currently, nuclear power produces about 12 percent of the world's electricity. Most of the world's nuclear power is produced in the former Soviet Union, the United States, France, Japan, and Germany.

The explosion within a nuclear power plant at Chernobyl in the Soviet Union focused greater public



attention on nuclear power. The Chernobyl disaster forced 130,000 people from their homes in an area estimated to be 11,600 square miles. The relatively high cost of producing nuclear energy has also emerged as a concern at the official level. Sweden is phasing out nuclear power entirely, while Germany, Britain, and most Eastern European countries are cutting back their programs.

Despite the dangers and the huge investment required for the construction of nuclear plants, nuclear power has gained support in many countries. France, for example, produces the most nuclear energy per capita in the world, meeting 75 percent of its electricity needs with nuclear power. Advocates of nuclear power note that fission does not produce greenhouse gases, and argue that new technology has reduced safety risks and improved efficiency.

Solar energy does not pose the safety problems associated with nuclear power and is virtually non-polluting. Since solar energy relies on the sun, it is also renewable. Currently, though, solar energy meets less than 1 percent of U.S. energy needs. Advances in technology have made solar power less expensive than nuclear power for some California utility companies. Even so, critics argue that solar energy remains years away from competing with other energy sources in terms of price and reliability.

Research is moving forward on other sources of energy as well. New technology has increased the efficiency of wind power from the earlier days of windmills. Currently, California's production of electricity from wind farms exceeds the production of the rest of the world. Geothermal energy from the heat of the earth's molten core is another potential source of power. The most common application of geothermal energy is producing electricity from hot springs. California produces one-third of the world's geothermal power. Still other researchers are considering the possibility of harnessing ocean tides to generate energy.

Among the more experimental forms of energy, fusion has attracted the most attention. Fusion produces energy by forcing the nuclei of atoms together. This process results in much less radioactive waste than nuclear fission and no greenhouse gases. Like nuclear fission, fusion requires large, expensive, centrally run facilities that produce only electricity. While many scientists do not view fusion as a practical alternative for most of the world, proponents of fusion energy emphasize its cleanliness and potentially inexhaustible supply. They believe that electricity produced from fusion will eventually prove to be cheaper than other energy sources. Western Europe, Japan, and the United States have pursued fusion development most actively. President Clinton has proposed spending $350 million in 1994 on fusion research and development.

Considering trade-offs

Each energy source, both existing and potential, has certain advantages and disadvantages. Coal, for example, is relatively plentiful and inexpensive, but also contributes significantly to the build-up of greenhouse gases. In contrast, wind power does not produce pollutants, but has yet to be seen as economically practical in most circumstances. As the United States considers future energy choices, policymakers and the public will be weighing the costs and benefits of each alternative. The prospects of new technologies may hinge on government decisions about the distribution of research funds and the direction of environmental regulations. And, as in other areas of industry and science, the decisions made in the United States are sure to have repercussions worldwide.

On a global scale, the distinct needs of the developing world often demand a different approach to energy policy. Energy sources that produce huge amounts of electricity, such as nuclear power and, potentially, fusion, require expensive facilities and sophisticated networks to transmit electricity long distances. Many developing countries, however, lack the money to build new plants and extend their electrical grids to remote areas. More localized energy sources, such as those envisioned by advocates of solar energy, small hydroelectric projects, and wind power, can generate electricity on a smaller scale.

Options in Brief

Option 1 — Putting the Economy First

Concern about the environment may be important, but for now the health of our nation's economy must assume top priority. That's what really touches the lives of Americans today. At a time when the United States is struggling to shake off a stubborn recession, we can not afford environmental policies that will hamstring our economy. Thousands of American workers in the coal and timber industries have already lost their jobs because of environmental restrictions. These people should not be made to suffer in the name of a distant and uncertain threat, particularly while scientists continue to debate the meaning of confusing research data. In the future, when our economy is stronger and scientific data is more conclusive, we will be better able to tackle whatever environmental problems may arise.

Option 2 — Taking the Lead

As the most powerful nation in the world, the United States must lead the world in confronting the challenges of the 21st century. Cleaning up the environment is already emerging as a key focus of science and industry. The nations of Western Europe and Japan recognize that new markets are opening up for environmentally sound products, and are moving quickly to develop innovative technologies. The United States cannot afford to lag behind in this field. Instead, we have an obligation both to ourselves and to the planet as a whole to take the lead in developing technologies that will protect the global environment. To accomplish our goals, the United States should avoid becoming entangled in the endless debates and discussions of international organizations. By acting decisively, not only do we provide a better world for future generations of Americans, but we ensure that the United States remains on the cutting edge of science and industry.

Option 3 — Sharing Environmental Responsibility

Although the United States and other countries in the developed world have taken steps to curb pollution, the population growth and irresponsible development of many poor nations poses a mounting threat to the planet. Isolating ourselves from damage to the environment is not possible. Rather, we must join with other developed countries in seeking a solution. During the past decade, the United States has lagged behind in environmental policies, but now we must wholeheartedly join our allies. In the end, only the developed countries have the technological know-how and the economic strength to restore the health of the planet. Poverty, overpopulation, and backward technologies have forced desperate people in poor countries to scratch out their existence with little regard to the environment. With the other developed nations, we should address the problems that lead to environmental destruction and oversee programs to implement environmentally responsible policies in poor countries.

Option 4 — Global Stewardship

With the survival of the planet at stake, global environmental problems outweigh national interests and must rank as the top priority on our national agenda. Other problems — like unemployment, crime, and drugs — are serious, but the looming environmental crisis threatens the very existence of humanity. Unless we make major changes in the way people live, we are headed for catastrophe. The United States and the other countries of the developed world are largely responsible for our current situation. We and the other countries of the world have to channel our technological resources toward creating a global economy that is environmentally sustainable for generations to come. Like never before in human history, the environmental crisis requires all people to work together for the good of our common earth. A new global outlook would mean giving up some of our sovereignty to international organizations and embracing countries of the developing world as partners in global decision-making.

Option 1

PUTTING THE ECONOMY FIRST

Concern about the environment may be important, but for now the health of our nation's economy must assume top priority. That's what really touches the lives of Americans today. As a country, we must focus our attention on reinvigorating our economy in the competitive global market. At a time when the United States is struggling to shake off a stubborn recession, we cannot afford environmental policies that will hamstring our economy. Thousands of American workers in the coal and timber industries have already lost their jobs because of environmental restrictions. These people should not be made to suffer in the name of a distant and uncertain threat, particularly while scientists continue to debate the meaning of confusing research data. In the future, when our economy is stronger and scientific data is more conclusive, we will be better able to tackle whatever environmental problems may arise.

The last few decades have shown that Americans will act responsibly to reduce pollution in our country. No one wants to destroy the ecology of his or her own backyard. The answer to environmental problems, however, does not lie in more governmental restrictions on people's lives – especially restrictions imposed by international organizations. Americans have long proved that we can take care of our own problems. The rest of the world – including poor nations with skyrocketing populations and high-polluting industries – should also learn to act responsibly. More foreign aid or more power for international organizations will not solve their problems. For ourselves and citizens of other countries, we should continue to promote international free trade and economic growth. Whatever problems may be facing our country in the future, a United States that is economically vigorous will be able to respond more effectively.

What policies should we pursue?

- We should not sign international environmental agreements that limit U.S. authority over our own economic and environmental policies.
- We should ensure that measures to protect our environment do not interfere with economic growth.
- We should help industry rebound from the recession by relaxing burdensome environmental regulations – such as fuel efficiency standards that hinder the auto industry.
- We should minimize regulations on the development of fossil fuel resources and other energy technologies that enhance our energy security.

How would Option 1 affect us?

Under Option 1, the U.S. government would do little to interfere with the progress of industry. In areas where environmental restrictions have stifled the economy, regulations would be revised. The forces of the free market would be allowed to determine prices for energy. Oil, coal, and natural gas would continue to serve as our most important sources of energy over the next decade. Eventually, however, market forces would likely lead to improved technology and lower prices for renewable energies, such as solar power. In the short term, our lives would change little under Option 1. Pollution may increase, but some industries would benefit from relaxed environmental standards and provide more jobs.

PROS SUPPORTING ARGUMENTS

1. Relaxing environmental regulations will give U.S. industries an opportunity to cut costs and create new jobs.

2. By proceeding cautiously in response to the current sensationalism regarding environmental problems, the United States will avoid rash policy decisions and be in a better position to weigh ongoing scientific research.

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3. Staying out of restrictive international environmental agreements will allow the United States to maintain control over its environment and economy.

4. By promoting economic growth, the United States will be in a better position in the long run to afford the costs of addressing problems at home, such as pollution.

CONS OPPOSING ARGUMENTS

1. By refusing to work with other countries on global environmental issues, the United States will find itself isolated from much of the international community.

2. Unless environmental problems are given high priority, U.S. science and industry will fall behind in an expanding field.

3. Neglecting environmental problems now will result in still greater harm to the health of both future generations and the planet as a whole.

4. Since the United States has the world's largest economy and is the world's leading polluter in many areas, any international plan to address global environmental problems will be doomed to failure without U.S. cooperation.

Option 2

TAKING THE LEAD

As the most powerful nation in the world, the United States must lead the world in confronting the challenges of the 21st century. Our place in tomorrow's world may very well be determined by how we respond today to environmental threats. Cleaning up the environment is already emerging as a key focus of science and industry. The nations of Western Europe and Japan recognize that new markets are opening up for environmentally sound products, and are moving quickly to develop innovative technologies. The United States cannot afford to lag behind in this field. Instead, we have an obligation both to ourselves and to the planet as a whole to take the lead in developing technologies that will protect the global environment. By acting decisively, not only do we provide a better world for future generations of Americans, but we ensure that the United States remains on the cutting edge of science and industry.

To accomplish our goals, the United States should avoid becoming entangled in the endless debates and discussions of international organizations. Rather, we should carry out our own program. Unfortunately, many of the problems affecting our environment are located far beyond our borders. Poor countries that chop down rain forests, dump sewage into the ocean, or run outmoded factories that pollute the atmosphere harm the health of the entire planet. Just as we have given poor countries aid to help them stop the expansion of communism, now we should use foreign aid to persuade countries to improve their environmental record. At home, the United States should invest in new technologies that will give us a jump in the growing market for environmentally sound products. Taxes on pollutants, such as carbon and sulfur and nitrogen oxides, should be imposed to spur our industries toward a cleaner, more efficient future. In the competitive world of the 21st century, the United States cannot afford to be second best.

What policies should we pursue?

- We should invest in the research and development of environmental technologies – especially in the area of renewable energy – that will be in demand internationally.

- We should promote energy efficiency, recycling, and the use of alternatives to fossil fuels by taxing the producers of pollution while giving tax breaks to companies that reduce pollution.

- We should grant favorable trading terms to countries that develop policies in line with U.S. environmental priorities while imposing trade sanctions on countries that violate environmental standards we favor.

- We should ensure that foreign economic aid is directed only to environmentally sound development projects that welcome U.S. environmental expertise.

- We should make sure that any new international environmental programs do not harm U.S. interests.

- We should incorporate research on the environment into our national planning strategies, as we do now with economic data, and invest in satellites and other high-tech systems to monitor the environment.

- We should create a corps of environmental specialists to help poor countries curb pollution that threatens the global environment.

How would Option 2 affect us?

Under Option 2, the U.S. government would actively encourage the development of new technologies designed to cope with environmental problems. Solar, fusion, and other non-polluting energy sources would particularly benefit from government-sponsored research programs. Industries producing environmentally sound technologies would receive special tax breaks. In the short term, Americans would have to pay higher taxes to fund Option 2. In addition, stricter environmental standards would hurt a few heavily polluting industries, lead to higher prices for products that contribute to pollution, and require that Americans stop driving old cars that still use leaded gasoline. Some companies would be unable to meet the stricter standards, leaving workers unemployed. At the same time, though, the development of environmentally sound technologies would create new businesses and new jobs.

PROS

SUPPORTING ARGUMENTS

1. Developing environmentally sound technologies will put the United States in the lead in a crucial field and help revive our economy.

2. Investing now to break our dependence on fossil fuels and promote energy efficiency will give U.S. industry a key competitive edge for the future.

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3. Just as we used foreign aid to guide countries away from communism, we can use foreign aid to compel countries to set responsible environmental policies.

4. The environment of the entire world will benefit from environmentally sound technologies developed by U.S. industry.

CONS

OPPOSING ARGUMENTS

1. By acting alone in pursuing global environmental policies, the United States will offend our key allies and trading partners in the developed world that have already taken steps to address global environmental problems.

2. Because the causes and effects of many environmental problems are global, the countries of the world must work together to guarantee an effective response.

3. Pressuring poor countries to adopt environmental standards set exclusively by the United States will cause resentment and defiance.

4. With the U.S. economy struggling to recover from recession, we cannot afford to suddenly change our energy policies and invest in unproven technologies.

Option 3

Sharing Environmental Leadership

Although the United States and other countries in the developed world have taken steps to curb pollution, the population growth and irresponsible development of many poor nations poses a mounting threat to the planet. Isolating ourselves from damage to the environment is not possible. Rather, environmental problems are of a global nature and can only be addressed cooperatively. We must join with other developed countries in seeking a solution. During the past decade, our partners in the developed world have taken a leading role in addressing the world's environment problems. The United States has lagged behind in environmental policies, but now we must wholeheartedly join our allies. In foreign policy, a new consensus has already emerged among the United States and the countries in Western Europe and Japan. Together, we defeated Iraqi dictator Saddam Hussein and coordinated efforts to help the countries of the former Soviet Union. By working as partners, the countries of the developed world have not only achieved their goals more effectively but have equitably shared the costs among themselves. In today's interconnected world, international cooperation on environmental problems is essential as well.

In the end, only the developed countries have the technological know-how and the economic strength to restore the health of the planet. Poverty, overpopulation, and backward technologies have forced desperate people in poor countries to scratch out their existence with little regard to the environment. With the other developed nations, we should address the problems that lead to environmental destruction and oversee programs to implement environmentally responsible policies in poor countries. The countries of the former Soviet bloc, for example, require our guidance to prevent them from continuing the environmentally reckless course they charted under communism. At the same time, we must also accept our share of the burden for protecting the health of the planet by adopting stronger measures to protect the environment at home.

What policies should we pursue?

- We should join with other developed countries to strengthen international measures to control global environmental problems.
- We should encourage international agencies that lend money to developing countries, such as the World Bank and the International Monetary Fund, to support only environmentally sound development projects.
- We should pledge to contribute 0.7 percent of our gross national product to aid for developing countries – in accord with United Nations' targets – by the year 2000.
- We should join with other developed nations to oversee the efforts of developing countries to research and manage their environmental problems.
- We should join with other developed nations to impose sanctions on countries that permit environmentally reckless development within their borders.
- We should join with other developed nations to establish a global environmental data program that would standardize environmental research worldwide.

How would Option 3 affect us?

Under Option 3, the U.S. government would strengthen regulations to clean up the environment in accord with the standards of other developed countries. We would commit ourselves to reducing carbon dioxide emissions and ending the production of CFCs. Industries would receive tax breaks to help them adjust to new environmental standards. In the short term, Americans would have to pay higher taxes to fund Option 3. In addition, stricter environmental standards would harm some industries and leave workers unemployed, as well as lead to higher prices for some goods. Companies producing environmentally sound products, however, would prosper and expand. As individuals, we would also have to make small changes in our way of life, such as ending the use of CFCs, to keep in step with measures in other developed countries. At the same time, though, Americans would benefit from sharing the costs of cleaning up the environment with people throughout the developed world.

PROS SUPPORTING ARGUMENTS

1. Cooperation among developed countries in pursuing the Persian Gulf war, coordinating aid to the former Soviet Union, and ending the famine in Somalia indicates that developed countries will effectively work together on environmental problems.

2. By setting aside part of their land for conservation in exchange for reductions in the debt they owe to developed countries, poor countries have shown that they are willing to cooperate with the developed world in protecting the environment.

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3. Now that the world is no longer divided by U.S.-Soviet rivalry, the developed world has a unique opportunity to forge a stable international consensus based on global environmental management.

CONS OPPOSING ARGUMENTS

1. Just as the Europeans and Japanese take advantage of U.S. policies promoting free trade, our allies in the developed world will use environmental cooperation to gain an unfair competitive edge.

2. The bureaucracy and regulations required to coordinate international environmental efforts will be one more strand of red tape holding down the growth of U.S. businesses.

3. Poor countries will refuse to cooperate if the developed world takes the lead in setting global environmental policies that hamper their development.

4. As the leader of the developed world, the United States will be expected to increase foreign aid for environmental programs at a time when we need the money at home.

5. With the Cold War over, maintaining close relations with Western Europe and Japan is no longer as important to our national security and should not be the driving force behind our environmental policy.

Option 4

GLOBAL STEWARDSHIP

With the survival of the planet at stake, global environmental problems outweigh national interests and must rank as the top priority on our national agenda. Other problems — like unemployment, crime, and drugs — are serious, but the looming environmental crisis threatens the very existence of humanity. Unless we make major changes in the way people live, we are headed for catastrophe. The United States and the other countries of the developed world are largely responsible for our current situation. The signs of environmental destruction that have emerged in the past few decades have alerted us that many of our basic assumptions must change. Our planet cannot survive the continued economic growth of developed countries and the desperate poverty of poor nations. Instead, we and the other countries of the world have to channel our technological resources toward creating a global economy that is environmentally sustainable for generations to come. Not only do we have to change our own lifestyles, but we must ensure that poor countries do not repeat our mistakes.

All countries — rich and poor — must have a voice in making our world a better place. Like never before in human history, the environmental crisis requires all people to work together for the good of our common earth. The United States can serve as a leading force for cooperation by fully supporting the role of the United Nations in charting global environmental policy. A new global outlook would mean giving up some of our sovereignty to international organizations and embracing countries of the developing world as partners in global decision-making. We should be ready to substantially increase aid to poor countries and accept changes in our personal lifestyles. Whatever the sacrifice, though, it's worth it. We are all citizens of the same planet, and we all have an obligation to safeguard the world for future generations.

What policies should we pursue?

- We should join with the international community to grant authority to the United Nations to establish strong international environmental laws and take part in enforcing global environmental standards.
- We should ensure that poor countries have an equal voice in developing global environmental policies.
- We should strive to be the first country in the world to contribute 0.7 percent of its gross national product for assistance to developing countries, thus meeting the goal established by the United Nations ahead of schedule.
- We should offer developing countries technology that will help them phase out high-polluting industrial processes, join in the development of global planning efforts, and send experts to deal with the most critical environmental crises.
- We should adopt as our own national laws the decisions of the United Nations on environmental matters.
- We should reduce the amount of resources we consume and shift our national priorities to create an economy that is environmentally sustainable.

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How would Option 4 affect us?

Under Option 4, the U.S. government would introduce measures to restructure our economy based on environmentally sound principles. In cooperation with the other countries of the world, we would promote the development of industries that are capable of prospering in harmony with the environment. Industries that do not fit this plan would be phased out. The country would also move quickly toward cutting carbon dioxide emissions at least in half and developing non-polluting energy sources. In the short term, Americans would have to pay significantly higher taxes to fund Option 4. In general, our dependence on the gasoline-powered automobile would have to give way to reliance on cleaner forms of transportation. Many workers would also face unemployment, at least temporarily, as the economy shifts toward sustainable growth. In addition, prices would rise on many goods. Eventually, though, the economy would adjust, as industries become more energy efficient and produce more environmentally sound goods. More importantly, Americans would benefit from a real improvement in the planet's environment and could look forward to better personal health as pollution decreases.

PROS

SUPPORTING ARGUMENTS

1. Considering that poor countries are home to more than 80 percent of the world's people, their full participation is essential if we are to solve global environmental problems.

2. Only by requiring Americans to change their way of life will we achieve improvements in the quality of our environment here at home.

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3. A new level of international cooperation is our only hope for addressing environmental problems that transcend national boundaries.

4. Poor countries will be unable to address global environmental problems without substantial economic assistance from the developed world.

5. Developing an economy that safeguards the environment is, in the long run, the only way to ensure the future of humanity.

CONS

OPPOSING ARGUMENTS

1. By turning over authority on environmental policy to international organizations, the United States will relinquish power to govern its own environment to a faceless global bureaucracy.

2. Stringent new regulations and more government spending will drag down our economy for years to come.

3. Funding international environmental programs will be too expensive, especially at a time when our own economy is struggling.

4. Providing corrupt, inefficient governments in poor countries greater international influence and additional aid will do little to improve the environment.

5. U.S. industry, struggling to regain its competitive edge, will be reluctant to develop new environmentally sound technologies that would be shared with other countries.

Five-Day Lesson Plan

DAY ONE

Defining global environmental problems

Objective: This discussion activity introduces students to the concept of global environmental problems and elicits ideas about the appropriate U.S. role in this area.

1. Instruct students to read "Exploring the Rainforest." Call on students to offer examples of "environmental problems." Do the issues discussed in the article fit their understanding of "environmental problems?" Why is the fate of the South American rainforest considered a "global" environmental problem? Ask students to identify other "global environmental problems?" Why has the concept of "global environmental problems" emerged only in the last few decades?

2. As noted in the article, many experts on the rainforests argue that this ecosystem should be considered a trust of humanity, similar to the status of Antarctica and the oceans. Does this sentiment conflict with our notion of national sovereignty? Point out that American settlers chopped down millions of acres of forest and nearly hunted the buffalo to extinction without receiving criticism from abroad. In light of our past, do we have the right to protest the present actions of people in South American countries? How does the United States contribute to the destruction of the rainforest (e.g., role of U.S. transnational corporations, demand in the United States for wood, beef, and other agricultural products, etc.)? What role should the United States play in addressing this issue?

3. Instruct students to read "Options in Brief" (page 20). Explain that each of the options summarizes a distinct viewpoint toward U.S. global environmental policy. Ask students to consider the problem of rainforest destruction from the perspective of the four options. For example, how would the policy recommendations of an Option 2 supporter differ from those of an advocate of Option 4?

Homework: Students should read Part I and Part II of the background readings and complete "Study Guide — Parts I and II."

DAY TWO

Global environmental problems in the international arena

Objective: This role play will help students consider how global environmental issues are perceived in different regions of the world.

1. Divide the class into four groups. Explain that students will represent different regions of the world participating in the UN Commission on Sustainable Development (UNCSD), a body created to follow up the work of the Earth Summit held in June 1992. Note that the main task of UNCSD is to implement Agenda 21, a non-binding, 800-page set of guidelines adopted by Earth Summit delegates to balance the needs of economic development and environmental protection.

2. Assign each group one of four regions: the developed world; the former Soviet bloc countries; the newly industrializing countries; and the underdeveloped countries. Instruct each group to formulate a brief presentation on the environmental problems and concerns of its region. For example, representatives of the newly industrializing countries should note that their people are beginning to suffer from the ill effects of industrial pollution and rapid urbanization. At the same time, though, they would be wary of environmental restrictions that would hamper their development and deny their people an opportunity to reach a standard of living comparable to the developed world. Students should base their presentations on the "Dilemmas of economic development" section, pages 7-9, in Part II of the background readings. A review of the location of the major countries in each region may also be useful.

3. Instruct each group to select a member to record the ideas of the group and a spokesperson to deliver the presentation. After the groups have given their presentations, ask students to analyze the viewpoints of the four regions. What are the major points of contention? What are the chief criticisms aimed at the United States? What is the likelihood of global consensus on environmental issues?

Homework: Students should read Part III and Part IV of the background readings and complete "Study Guide — Parts III and IV."

DAY THREE

Role playing the four options: organization and preparation

Objective: This two-day simulation will familiarize students with leading issues that frame the debate on U.S. global environmental policy.

1. Inform students that they will participate in a simulation using the options and the background readings. Form four groups of three to four students. Assign an option to each group. The remainder of the class will serve as members of an advisory panel to counsel the president on U.S. policy toward global environmental problems. (In smaller classes, other teachers or administrators may be invited to serve as members of the presidential advisory panel. In larger classes, additional roles — such as those of newspaper reporter or lobbyist — may be assigned to students.)

2. Distribute "Presenting Your Option" to the four option groups and "U.S. Global Environmental Policy" to the advisory panel. Inform students that each option group will be called upon in Day Four to present the case for its assigned option to the advisory panel. Explain that option groups should follow the instructions in "Presenting Your Option." Note that the option groups should begin by assigning each member a role. (As an extra challenge, ask the groups to design a poster illustrating the best case for their option.) While the option groups are preparing for their presentation, members of the advisory panel should develop cross-examination questions for Day Four (see "U.S. Global Environmental Policy"). Remind advisory panel members that they are expected to turn in their cross-examination questions at the end of the simulation.

Homework: Students should complete preparations for the simulation.

DAY FOUR

Role playing the four options: debate and discussion

1. Organize the room so that the four option groups face a row of desks reserved for the presidential advisory panel. Distribute "Evaluation Form" to the advisory panel members. Explain that the simulation will begin with three-to-five minute presentations for the spokespersons of the option groups. Encourage the spokespersons to speak clearly and convincingly.

2. Following the presentations, invite members of the advisory panel to ask cross-examination questions. Make sure that each panel member has an opportunity to ask at least one question. The questions should be evenly distributed among all four option groups. If time permits, encourage members of the option groups to challenge the positions of the other groups. During cross-examination, allow any option group member to respond. (As an alternative approach, permit cross-examination after each option is presented.)

3. Instruct members of the presidential advisory panel to fill out the first part of their "Evaluation Form" during the course of the period. The second part of the worksheet should be completed as homework.

Homework: Students should read each of the four options, then fill out "Focusing Your Thoughts," and complete "Your Option Five."

DAY FIVE

Looking into the future

Objective: This exercise will allow students to evaluate their options in a personalized context.

1. Call on members of the presidential advisory panel to share their evaluations of the option groups. Which arguments were most convincing? Which beliefs were most appealing? Review the beliefs in "Focusing Your Thoughts," noting the relationship between beliefs and options. Call on students to explain how their beliefs guided their responses in "Your Option Five."

2. Inform students that they will be using their responses to "Your Option Five" as the basis for writing a letter projected one generation into the future. Students should imagine that the recipient of their letter is their own teen-age child. They should also assume that the recipient of the letter shares many of their own questions about environmental issues. The opening salutation should be addressed "Dear Son/Daughter." Instruct students to begin the letter by summarizing the beliefs and policies of their option. The conclusion of the letter should explain how the proposed option will result in a better life for the next generation. (Students may be given the choice of working individually or in pairs.)

3. *Extra Challenge:* As homework, instruct students to write a letter based on their option to the editor of a local newspaper, a member of Congress, or the president. Suggest that students focus on issues emerging from the Earth Summit.

Encourage students to explore the local dimension of global environmental issues. For example, how will U.S. efforts to reduce the emission of greenhouse gases and ozone-depleting chemicals affect the local environment and economy? Have local businesses developed new products and services to reduce pollution? Suggest that students contact organizations that have sought to make their voices heard in the debate on environmental issues. Many community-based environmental groups maintain ties to national advocacy organizations. Major corporations, especially those involved in the energy business, also are often active in environmental issues.

Alternative Three-Day Lesson Plan

DAY ONE: See Day One of the Five-Day Lesson Plan.

DAY TWO: Assign each student one of the four options, and allow a few minutes for students to familiarize themselves with the mindsets of the options. Call on students to evaluate the benefits and trade-offs of their assigned option. How do the options differ in their assumptions about the relative importance of global environmental problems? How would the U.S. role in the world change according to the recommendations of the options? Moving beyond the options, ask students to imagine that they have been called upon to advise the president on U.S. global environmental policy. What concerns would be at the top of their agenda? Students should complete "Focusing Your Thoughts" and "Your Option Five" as homework.

DAY THREE: See Day Five of the Five-Day Lesson Plan.

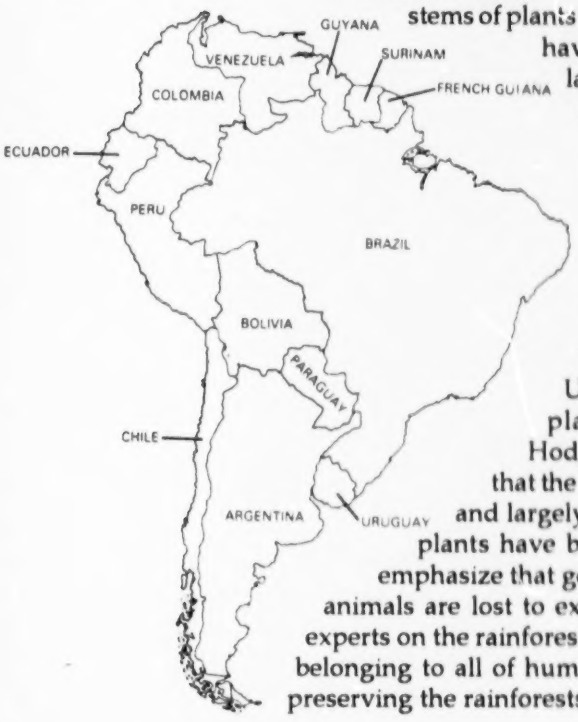
Exploring the Rainforest

In the Amazon Basin of South America, farmers, loggers, and cattle ranchers are rapidly clearing away the tropical rainforests that cover much of the land along the equator.

In hospitals throughout the world, d-tubocurarine serves as the basis for drugs that are used thousands of times daily to relax muscles without deep anesthesia during surgery and to treat multiple sclerosis, Parkinson's disease, and other muscular disorders.

How are South American rainforests and health care related? The answer provides an introduction to a complex set of issues known as global environmental problems.

Maps on File



D-tubocurarine is derived from curare — a dried extract of the bark and stems of plants that grow in the Amazon Basin. South American Indians have long poisoned the tips of their arrows with curare. In large doses, curare poisoning can paralyze the muscles of the respiratory system and lead to death. In the 1930s and 1940s, however, scientists demonstrated that controlled amounts of curare could be used as a temporary muscle relaxant. D-tubocurarine and later generations of drugs derived from curare have been highly valued as an anesthetic that does not produce harmful side-effects.

There are eighteen drugs currently used just in the United States that are obtained directly from tropical forest plants, including treatments for malaria, glaucoma, Hodgkin's disease, and leukemia. Many scientists believe that the pharmaceutical potential of the rainforests is enormous, and largely untapped. They note that only 1 percent of rainforest plants have been tested for their medicinal value. Moreover, they emphasize that genetic resources are irreplaceable. Once rare plants and animals are lost to extinction, they are lost forever. For that reason, many experts on the rainforests have urged world leaders to view them as a resource belonging to all of humanity. They want governments everywhere to join in preserving the rainforests for future generations.

At the moment, however, the rainforest in much of South America is under threat from human activity. Just as Americans tamed the frontier by clearing millions of acres of woodland in earlier centuries, people in Brazil, Venezuela, and other countries have increasingly sought to escape the poverty of overcrowded coastal regions by settling in the Amazon Basin. Every year, an area of rainforest the size of New York state is destroyed or severely damaged. Experts estimate that worldwide half the rainforest has been destroyed in the past 40 years.

As Americans, what does this mean for us?

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Name:_____

Study Guide – Parts I and II

Global Environmental Problems/The Human Factor in the Changing Environment

1. Summarize the causes and effects of each of the following problems:

Global warming

Ozone depletion

Acid rain

Deforestation and desertification

Decline of biodiversity

2. Why are most global environmental problems linked to industrialization?

3. Summarize how people in the four major regions of the world view environmental problems:

Developed world

Former Soviet bloc

Newly industrializing countries

Underdeveloped world

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Study Guide – Parts III and IV

Public Policy and the Environment/The U.S. Role in Global Environmental Politics

1. How did the goals of rich countries at the Earth Summit differ from the goals of poor countries?

2. Which Earth Summit controversies best illustrated the divisions between rich and poor countries?

3. How has the concept of "global environmental problems" changed in the international arena since the 1972 Stockholm Conference?

4. How has President Clinton's position on environmental policy differed from the position of President Bush?

5. Taking into account economic considerations, what changes in energy policy would you suggest to improve the environment?

Presenting Your Option

Day One — Preparing Your Presentation

Your Assignment: Your group has been called upon to appear before a panel that will advise the president on U.S. global environmental policy. Your assignment is to persuade panel members that your option should be the basis for U.S. policy. You will be judged on how well you present your option.

Organizing Your Group: Each member of your group will take a specific role. Below is a brief explanation of the responsibilities for each role.

1. *Spokesperson:* Your job is to explain the option of your group to the presidential advisory panel in a three-to-five minute presentation. In preparing your presentation, you will receive help from the other members of your group. You should include arguments from their areas of expertise. Keep in mind, though, that you are expected to take the lead in organizing your group. Read your option and review the background readings to build a strong case for your option.

2. *Environmental Scientist:* Your job is to advise the spokesperson of your group on why your option is scientifically sound. As a scientist, you are familiar with the causes and effects of environmental problems. Carefully read your option, and then review the sections of the background readings that deal with your area of expertise. Pay special attention to Part I (pages 1-4) and the "Population pressures" section of Part II (pages 5-7).

3. *Domestic Policy Analyst:* Your job is to advise the spokesperson of your group on how the policies of your option would address problems here at home. You should concentrate on assessing the effects of your option on our domestic environment and economy. Carefully read your option and then review the sections of the background readings that deal with your area of expertise. Pay special attention to Part IV (pages 15-19).

4. *Foreign Policy Analyst:* Your job is to advise the spokesperson of your group on why the policies of your option would address our foreign policy concerns. You should concentrate on assessing the effects of your option internationally, particularly in regard to our country's role in the world. Carefully read your option and then review the sections of the background readings that deal with your area of expertise. Pay special attention to the "Dilemmas of economic development" section of Part II (pages 7-9) and Part III (pages 10-14).

Day Two — Making Your Case

On Day Two, your spokesperson will deliver a three-to-five minute presentation to the presidential advisory panel. Notes can be used, but the spokesperson should speak clearly and convincingly. During the presentations of the other groups, you should try to identify the weak points of the competing options. After all of the groups have presented their options, members of the advisory panel will ask you cross-examination questions. Any member of your group may respond during the cross-examination period.

U.S. Global Environmental Policy

Presidential Advisory Panel Members

Your Role

You have been selected to serve on a select panel that will advise the president on U.S. global environmental policy. As you know, scientists in the past few decades have come to recognize that a new set of environmental issues has emerged. Problems such as global warming and depletion of the ozone layer affect the entire planet. These concerns have lately entered the domain of international relations. As you also know, the past five years have witnessed dramatic changes on the world stage. The collapse of communism brought an end to the Cold War between the United States and the Soviet Union. New possibilities for international cooperation have arisen, while at the same time new challenges and new requests for U.S. assistance have also surfaced. In this exercise, you should take all of these factors into account as you consider four different approaches to U.S. global environmental policy. What you decide will play a key part in shaping the U.S. role in the world as our country enters the 21st century.

Your Assignment

While the four option groups are organizing their presentations, you should prepare two questions regarding each of the options. Your teacher will collect these questions at the end of the exercise.

Your questions should be challenging and critical. For example, a good question for Option 1 might be:

> *If the United States adopts Option 1, how would our relations with Western Europe and Japan be affected?*

On Day Two, the four option groups will present their positions. After the presentations are completed, your teacher will call on you and your fellow panel members to ask questions. The "Evaluation Form" you receive is designed for you to record your impressions of the option groups. Part I should be filled out in class after the option groups make their presentations. Part II should be completed as homework. After this activity is concluded, you may be called upon to explain your evaluation of the option groups.

Center for Foreign Policy Development

Permission granted for duplication

Name:_____

Evaluation Form

Presidential Advisory Panel Members

Part I

What was the most persuasive argument presented in favor of this option?	What was the most persuasive argument presented against this option?
Option 1	*Option 1*
Option 2	*Option 2*
Option 3	*Option 3*
Option 4	*Option 4*

Part II

Which group presented its option most effectively? Explain your answer.

Focusing Your Thoughts

Instructions: You have had an opportunity to consider four options on U.S. global environmental policy. Now it is your turn to look at each of the options from your own perspective. Try each one on for size. Think about how the options address your concerns and hopes. You will find that each has its own risks and trade-offs, advantages and disadvantages.

Ranking the Options

Which of the options below do you prefer? Keep in mind that the beliefs you support most strongly should guide your choice. Rank the options, with "1" being the best option for the United States to follow.

___ **Option 1: Putting the Economy First**

___ **Option 2: Taking the Lead**

___ **Option 3: Sharing Environmental Leadership**

___ **Option 4: Global Stewardship**

Beliefs

Considering the statements below will help you answer the first three questions of "Your Option Five." Rate each of them according to your personal beliefs:

1 = Strongly Support
2 = Support
3 = Oppose
4 = Strongly Oppose
5 = Undecided

___ To solve global problems, rich and poor countries must work together.

___ As the most powerful nation in the world, the United States is capable of addressing international problems without relying on other countries.

___ The United States should not allow other countries to shape policies that affect the lives of Americans.

___ Countries that are poor and technologically backward have only themselves to blame.

___ The United States has a responsibility to share science and technology to help solve the most pressing problems in poor countries.

___ The health of the U.S. economy has a greater impact on the lives of Americans than any other issue.

___ The United States needs the help of Western Europe and Japan to deal with international problems.

___ Poverty, lack of development, and corruption have left many poor countries unable to cope with critical problems within their borders.

___ In our competitive world, the United States can not afford to give up any advantage in science and technology.

___ Americans today need to make sacrifices in their way of life to safeguard the world for future generations.

Creating Your Own Option

Your next assignment is to create an option that reflects your own beliefs and opinions. You may borrow heavily from one option, or you may combine ideas from two or three options. Or you may take a new approach altogether. There are, of course, no perfect solutions. And there is no right or wrong answer. Rather, you should strive to craft an option that is logical and persuasive. Be careful of contradictions. For example, we should not offer to share our technology with other countries if our goal is to take the lead in industries that protect the environment. The "Your Option Five" worksheet will help you organize your ideas.

Name:_____

Your Option Five

1. How important are environmental problems compared to other problems facing the United States?

2. Which parts of the world pose the greatest threat to the global environment?

3. What changes, if any, should the United States make in our relations with other countries in response to environmental problems?

4. Summarize the option you think the United States should adopt regarding global environmental policy.

5. What are the two strongest arguments opposing your option?

   A.

   B.

6. What are the two strongest arguments supporting your option?

   A.

   B.

Rio Declaration on Environment and Development

The United Nations Conference on Environment and Development,
Having met at Rio de Janeiro from 3 to 14 June 1992,
Reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and seeking to build upon it,
With the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people,
Working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system,
Recognizing the integral and interdependent nature of the Earth, our home,
Proclaims that:

Principle 1

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 3

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5

All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

Principle 6

The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

Principle 7

States shall cooperate in a spirit of global partnership to conserve, protect, and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 8

To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

Principle 9

States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

Principle 10

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Principle 11

States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

Principle 12

States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

Principle 13

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 14

States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substance that cause severe environmental degradation or are found to be harmful to human health.

Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Principle 16

National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 17

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

Principle 18

States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

Principle 19

States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

Principle 20

Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Principle 21

The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

Principle 22

Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture, and interests and enable their effective participation in the achievement of sustainable development.

Principle 23

The environment and natural resources of people under oppression, domination, and occupation shall be protected.

Principle 24

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.

Principle 25

Peace, development and environmental protection are interdependent and indivisible.

Principle 26

States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

Principle 27

States and people shall cooperate in good faith and in a spirit of partnership in the fulfillment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

Suggested Reading

Blackburn, Anne M. *Pieces of the Global Puzzle: International Approaches to Environmental Concerns*. Golden, Colorado: Fulcrum, 1986. 204 pages.

Carroll, John E., ed. *International Environmental Diplomacy: The Management and Resolutions of Transfrontier Environmental Problems*. New York: Cambridge University Press, 1988. 291 pages.

Goldfarb, Theodore E. *Taking Sides: Clashing Views on Controversial Environmental Issues*. 4th ed. Guilford, Connecticut: The Dushkin Publishing Group, Inc., 1991. 334 pages.

Gore, Al. *Earth in the Balance: Ecology and the Human Spirit*. Boston: Houghton Mifflin Company, 1992. 407 pages.

McKee, David L. *Energy, the Environment and Public Policy: Issues for the 1990s*. New York: Praeger, 1991. 220 pages.

Pirages, Dennis. *Global Technopolitics: The International Politics of Technology and Resources*. Pacific Grove, California: Brooks/Cole Publishing Company, 1989. 220 pages.

Silver, Cheryl Simon and DeFries, Ruth S. *One Earth One Future: Our Changing Global Environment*. Washington, D.C.: National Academy Press, 1990. 196 pages.

Simon, Julian L. and Kahn, Herman, ed. *The Resourceful Earth: A Response to Global 2000*. Oxford and New York: B. Blackwell, 1984. 585 pages.

United Nations Conference on Environment and Development. *The Global Partnership for Environment and Development: A Guide to Agenda 21*. New York: United Nations Publications, 1992. 116 pages.

World Resources Institute. *The 1992 Information Please Environmental Almanac*. Boston: Houghton Mifflin Company, 1992. 606 pages.

World Resources Institute, UN Environment Programme and UN Development Programme. *World Resources 1992-1993*. New York: Oxford University Press, 1992. 385 pages.

Worldwatch Institute. *State of the World 1992: A Worldwatch Institute Report on Progress Toward a Sustainable Society*. New York: W. W. Norton and Company, 1992. 256 pages.

Information on the environment is available electronically to subscribers of the ECONET *telecommunications services sponsored by the Institute for Global Communications. For more information on this service, write to* ECONET, *18 deBoom Street, San Francisco, CA 94107, or call (415) 442-0220.*

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